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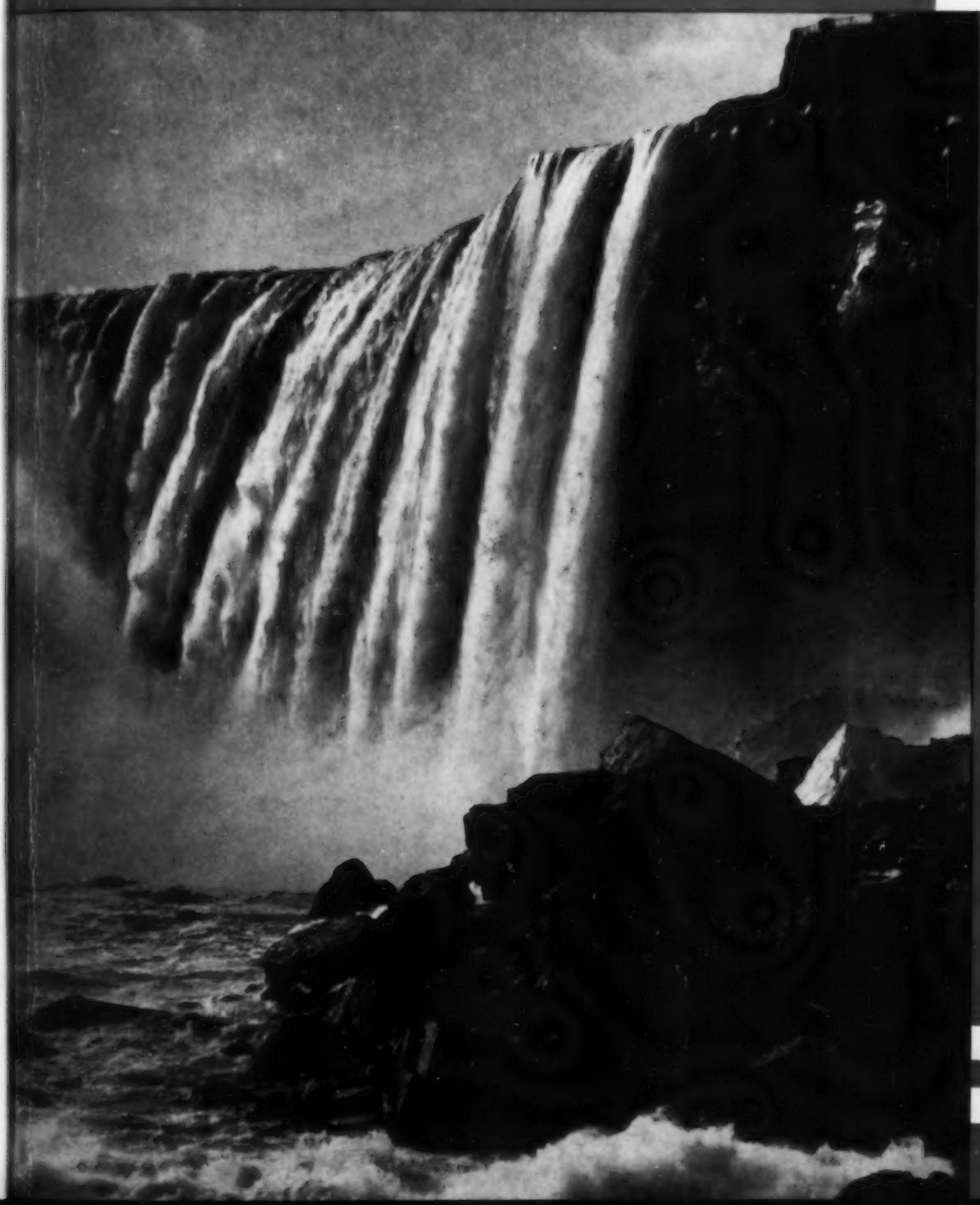

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..... AS OTHERS SEE US

THE CANADIAN GOVERNMENT extends a most cordial invitation to all who attend the World's Fair in New York this year, to visit the Canadian Pavilion.

Here visitors to the Fair and to the Canadian Pavilion will see, possibly for the first time, a concentrated visual picture of Canada—its attractions as a land of play-grounds; its business opportunities of active trade and commerce; its opportunities for investment, and its practically unlimited agricultural, mining, fishing and lumbering resources.

While it would require a much larger space at the World's Fair Grounds to adequately present Canada to the stranger, nevertheless it is confidently felt that every Canadian and every stranger visiting this Pavilion will leave it impressed with the position which the Dominion now holds among the nations of the world.

To Canadian visitors there will be a satisfaction in connection with the efficient effort which is being made to further the interests of the Dominion and her resources by exhibitions such as this. It is to be remembered that each exhibition held from time to time in various parts of the world presents its own special problems, depending upon the country in which the exhibition is held and the logical displays which should be made.

Exhibitions are but one of the many functions of the Department of Trade and Commerce of Canada. In addition to those there is the educational work of the Motion Picture Bureau, the informative work of the Bureau of Statistics, and the untiring efforts of Trade Commissioners located in strategic points throughout the world, not only to increase the present volume of trade between the Dominion and other parts of the world, but to create goodwill, which it is hoped will be part of the results of the Dominion's Pavilion at the New York World's Fair.

T.C. 402

DEPARTMENT OF TRADE AND COMMERCE

CANADIAN GEOGRAPHICAL JOURNAL

Editor - *Gordon M. Dallyn*

172 WELLINGTON STREET, OTTAWA

This magazine is dedicated to the interpretation, in authentic and popular form, with extensive illustrations, of geography in its widest sense, first of Canada, then of the rest of the British Commonwealth, and other parts of the world in which Canada has special interest.

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The British standard of spelling is adopted substantially as used by the Dominion Government and taught in most Canadian schools, the precise authority being the Oxford Dictionary as edited in 1936.

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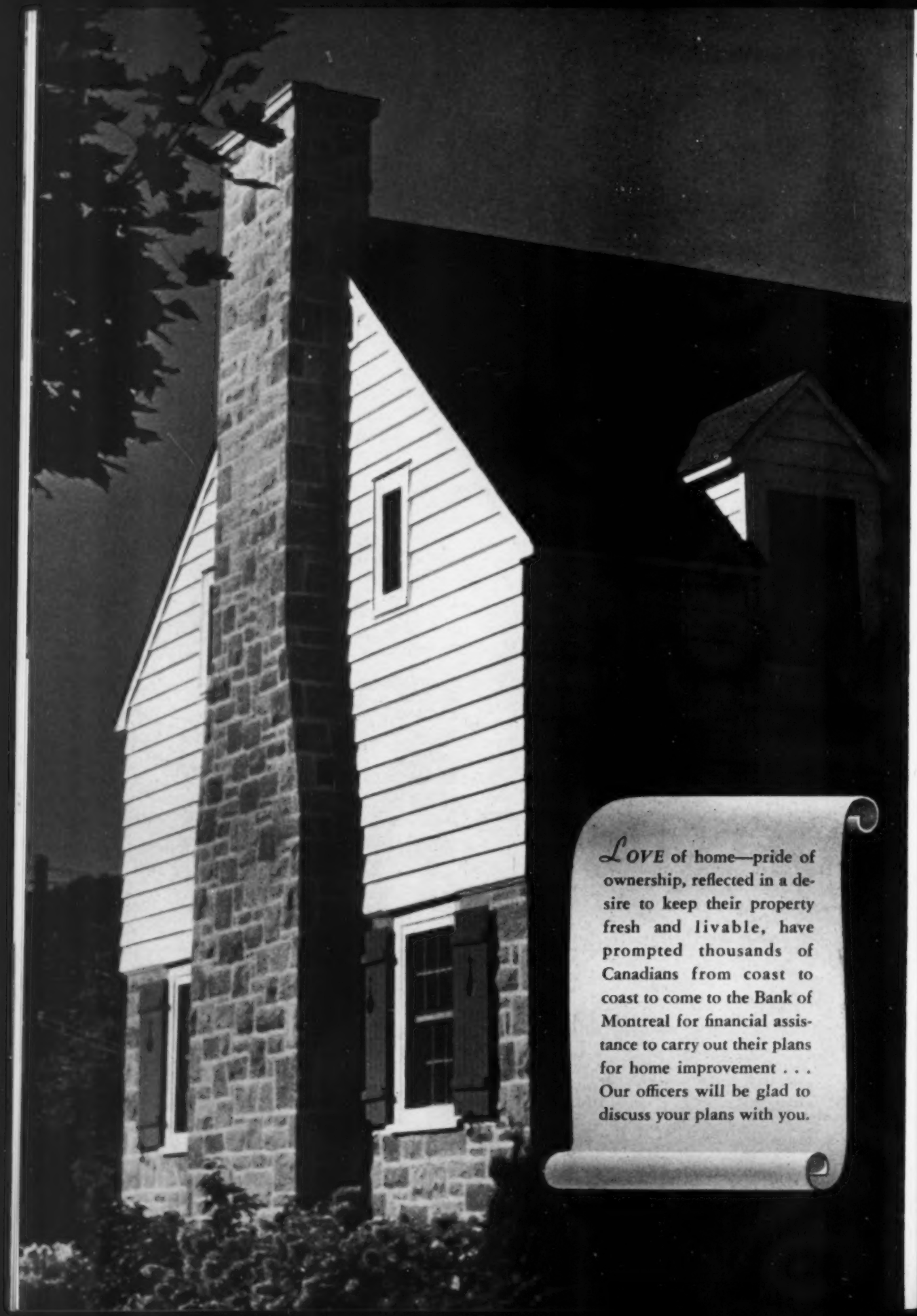

LOVE of home—pride of ownership, reflected in a desire to keep their property fresh and livable, have prompted thousands of Canadians from coast to coast to come to the Bank of Montreal for financial assistance to carry out their plans for home improvement . . . Our officers will be glad to discuss your plans with you.

THE QUEEN ELIZABETH WAY

by **R. M. SMITH**

TRAFFIC movement and highway transportation during the last twenty-five years have become absolutely revolutionized. In 1914 the automobile was little better than a novelty and certainly not accepted as a necessity. To have visualized lines of rumbling trucks heavily laden with merchandise and the unending passing of passenger cars would have been beyond imagination. It just would not come to pass. There was no occasion for unusual action so far as roads were concerned — simply a matter of maintaining the old gravel surface or the restoration of a bridge when one had collapsed, but definitely no capital expenditures on any scale. Then the motor-car improved and increased in numbers; truck transportation became a factor. The first World War demonstrated the feasibility and convenience of motor-truck movement, and roads, such as they were, went to pieces. Motor clubs began to spring up throughout the country; counties commenced the development of their main roads and asked for government assistance; industries began the study of motor-truck transportation; cities demanded outlets and better highway approaches, and officials representing all types of authorities insisted that something be done to relieve the situation.

In 1917, the Province of Ontario amended the Highway Improvement Act permitting the province to assume certain highways for special consideration, the cost of which would be distributed among the interested authorities in proportion to the benefit received. Very little progress was made, however, and money was short. The War was still on and the municipalities and the Government hesitated to launch into elaborate road building schemes that might lead them into debt. It was also claimed that the roads were being built for the benefit of the motorist alone. Pressure continued to be exerted not only upon the Governments of the provinces, but upon the Federal authorities as well. The consequence was that in 1919 the Canada Highways Act was passed.

This provided for the setting aside of a fund of $20,000,000 to be applied toward the building of trunk and market roads in the various provinces, the cost of which was to be worked out on a percentage basis typical of that which applied in the United States. The expenditure of this money in this province had the hoped-for effect. As roads were graded and gravelled came the demand for additional miles. Time went by but not without the increase of motor traffic. As highways stretched across the country, motor-car registrations continued to expand. A mere 35,357 in Ontario in 1914, the total had reached 338,426 in 1925. Paved surfaces commenced to appear, gravelled areas with their dust were replaced by smooth sections of concrete and bituminous highways. The object was to connect cities, towns and villages throughout the province — a paved highway to every county town. Year followed year and grading of roads proceeded with pavements being laid as fast as consolidated earth and gravel would permit. By 1930 the southern part of the Province of Ontario was well on its way to a realization of its original dream.

In the meantime, under the direction of the Northern Development Branch, the road pioneer was pushing his way through our northland. Help was given to the settler, to the miner or the lumberman, hesitantly, one must confess, sometimes half-heartedly, but still moving forward even in the face of antagonistic public opinion. Then mines commenced to prove their worth, lumbering expanded, pulp and paper became an industry, settlements and cities replaced timberland, and almost over night the country became permanent. Unfortunately, the vast northland is handicapped by magnificent distances; 300,000 square miles to be served with highways. The province did the only thing it could with the finances at its disposal. It built the cheapest type of road it was possible to construct so long as it was passable. Roads were stretched to their elastic limit and frequently beyond. Many important centres were serviced with

The Peace Bridge, joining the Province of Ontario at Fort Erie with the State of New York. One of the many magnificent
to maintain and prosper a real and vital international

roadway rarely equal to the well-known township road of the south, but permanency in establishment creates permanency in other lines, not excluding highways. By 1934 the time had come to consider the replacement of temporary roads with permanent highways, built to modern standards, requiring improved alignments, grades and surfaces of sufficient width to be absolutely safe under all conditions.

Returning to an analysis of the south, we find the Government being forced into the next stage of highway development, with increased tourist traffic, heavier local traffic, increasing speed and requests for better and safer roads all demanding consideration. The United States had realized the necessity and justification for express highways; why not Ontario? And so the Department of Highways faced an insistent, and sometimes impatient, motoring public ready and willing to pay for the type of highway that would meet their specifications.

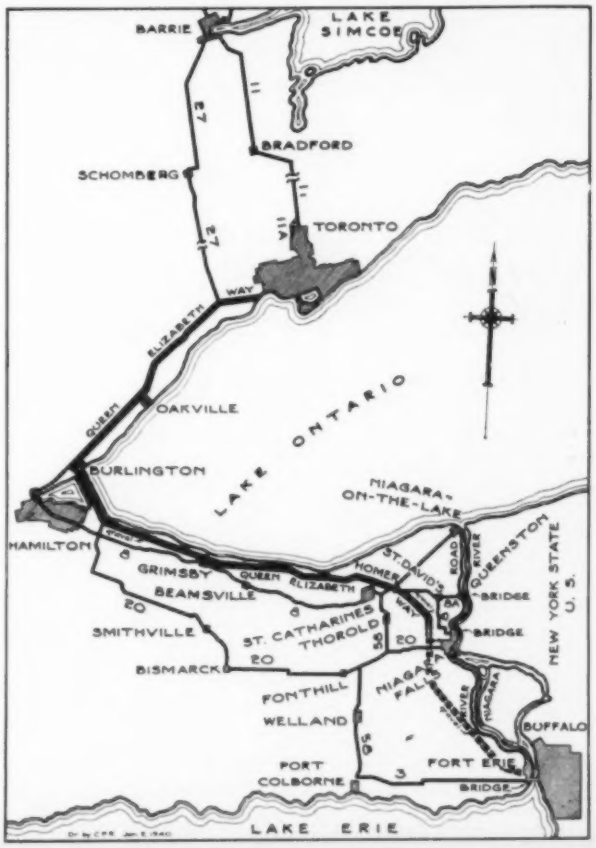
Surveys of traffic movement in Ontario indicated that less than two per cent of the total mileage of the province, built as dual highway, would be sufficient to accommodate close to fifty per cent of all through traffic; that distances measured in time would be enormously reduced, outlying sections would become more easily accessible, with traffic passing over highways providing the last word in comfort and safety. Obviously, the heavily travelled lanes proceed to border points—Windsor, Sarnia, Niagara, the St. Lawrence, Ottawa—and to the north, approximately a thousand miles in all. Slow of construction and expensive, they will take many years to build, but hope is entertained that their completion should not be later than 1960.

Aside from the divided highway of the south, Ontario has commenced the express type of development in our northland, replacing as it will the tortuous, winding, hilly roads of that country. Direct and of modern construction, it will facilitate

steel and concrete structures which link Canada and the United States for traffic purposes and which help in no small way neighbourliness of more than a hundred years' standing.

traffic movement, and encourage tourist traffic to an enormous extent. While single in comparison with the divided road, the surface of all pavement will be of ample width to permit of rapid movement with safety and pleasure. Altogether, it is estimated 1,700 miles will be required to properly serve the northern section of the province. Here again many miles pass through extremely rocky country where we are faced with enormous expenditures. It is the sincere hope of the Department to provide a high class system of highway throughout this northern section at the earliest possible date.

Ontario's first and most important road problem has been the relief of the congested traffic condition between Toronto and the Niagara Peninsula. The old Toronto and Hamilton Highway, built in 1914-15, an eighteen-foot concrete slab, and the twenty-



Sketch map showing route and arterial connections, Queen Elizabeth Way.

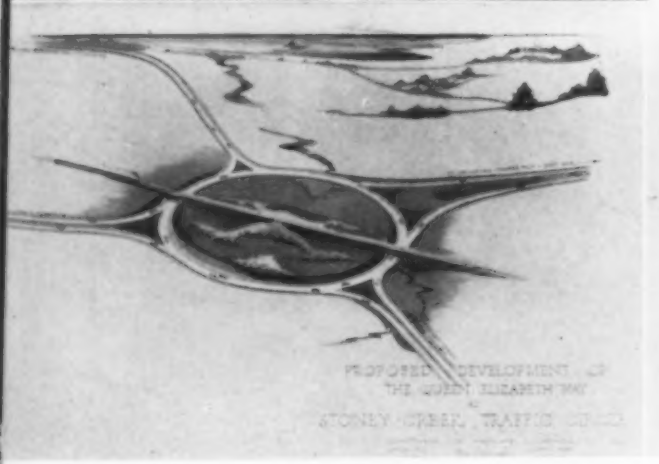
foot roadway on Dundas Street, connecting the same cities, while adequate at the time of their construction, were congested by motor traffic to such an extent as to be dangerous and certainly not in keeping with modern requirements.

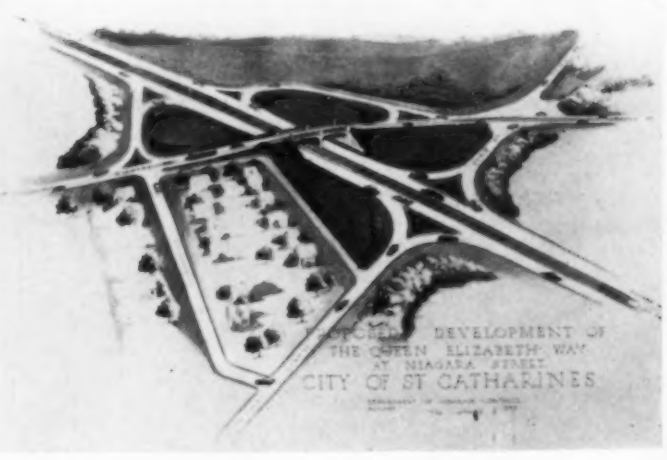
Studies were made with a view to determining, first, whether it would be advisable to widen the existing rights-of-way and develop a second highway paralleling the one in existence, or second, to purchase a new right-of-way which would run as directly as possible from Toronto to the Niagara River.

Analyses of the surveys made indicated most definitely that the first scheme was out of the question. In the case of the Lake Shore Road property damages ran into prohibitive sums; village and settled areas would be disturbed or destroyed, and through traffic conditions little improved because of the road passing through business areas. The alternative, Dundas Street, offered little improvement; not only did property damages run into large figures, but the topography of the country made construction very expensive. Existing surfaces on both roads would have been practically destroyed, not to mention traffic inconvenience over a period of three to four years while the highway was being constructed.

The least expensive and by far the most serviceable scheme was shown to be the development of a four-lane highway which would have its own right-of-way as far as possible and would by-pass towns, cities and villages so that little or no interference would apply on local roads or main thoroughfares within these urban centres, ample provision being made for entrance or egress to and from the municipalities affected. Such has been the policy in the development of this express highway.

Work commenced on this highway in the spring of 1931. Property was acquired for approximately a one hundred-foot right-of-way and grading of the first section from Brown's Line to Oakville was partly completed. Structures were also started, the first project being well under way when the Government changed in June, 1934. The new regime was in entire sympathy with the policy of building the highway and agreed with the four-lane idea, but felt that the direction lines of traffic should be separated and that grassed areas should be placed in the centre of the roadway thereby eliminating head-on





Left: — Road marker identifying the Queen Elizabeth Way.

Lower left: — Traffic circle and railway grade separation, Stoney Creek.

Below: — Expediting traffic control approaching the City of St. Catharines.

collisions and adding much to the comfort of night driving. Added width to permit of a centre boulevard was obtained and work continued. The far-sighted theory has been justified and in a most practical way since sections of the road have been opened for traffic.

The highway, known originally as the Middle Road, but later christened the Queen Elizabeth Way at the request of the province and by gracious consent of Her Majesty, Queen Elizabeth, will eventually reach to Fort Erie. It will finish directly opposite the Peace Bridge over the Niagara River, a fitting juncture when one remembers that this fine structure, built to commemorate more than one hundred years of friendship between Canada and the United States, was opened by His Royal Highness, the Prince of Wales, in 1927.

An important artery to the Queen Elizabeth Way will be its connection with the new Rainbow Bridge being built over the Niagara River at Niagara Falls. This new structure, replacing, as it will, the destroyed bridge of the International Railway Company, provides many attractive features and conveniences, facilitating motor and other traffic in a way that the old structure could not possibly do. This means an international transportation movement, the limit of which cannot possibly be foreseen.

Safety is being built into the highway; every modern improvement known to highway engineering has been incorporated; grades have been reduced to a maximum of three per cent and no curve shall exceed two degrees. Separation will apply at all intersecting, heavily travelled roads and railways. Clover-leaf construction takes care of entrances and outlets to towns and cities. As the work has progressed added improvements have been made. Typical of these has been the separated bridge, aligned to fit the travelled way and accommodating traffic in each direction without possible collision.

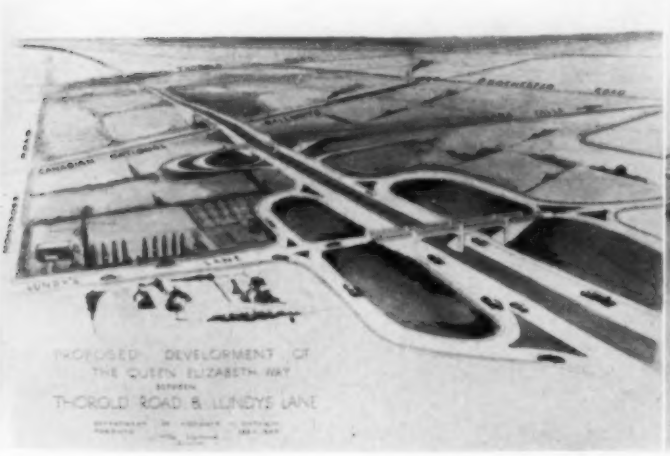
Adjacent to cities, towns and villages, it has been the policy to lower the grade line of the divided highway to such an elevation that the intersecting streets passing over the highway will continue without interruption and with little change in appearance; in fact, the passing of the highway through the centre makes for convenience, not for inconvenience — a transportation facility of unlimited value.

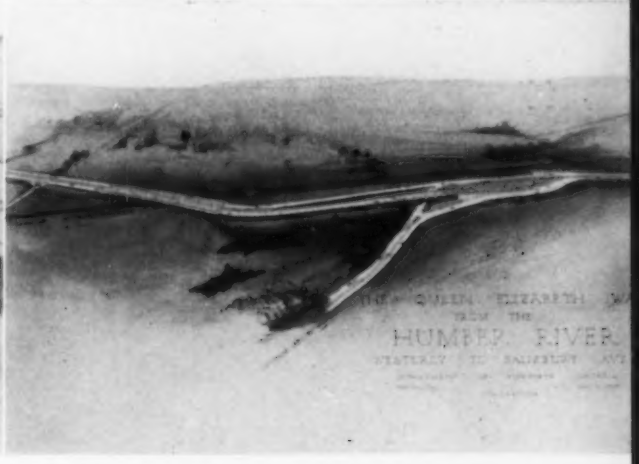
In keeping with the idea of safety, the highway will eventually be lighted. Approximately fourteen miles have already been finished, between Brown's Line and Oakville. The balance of the road will

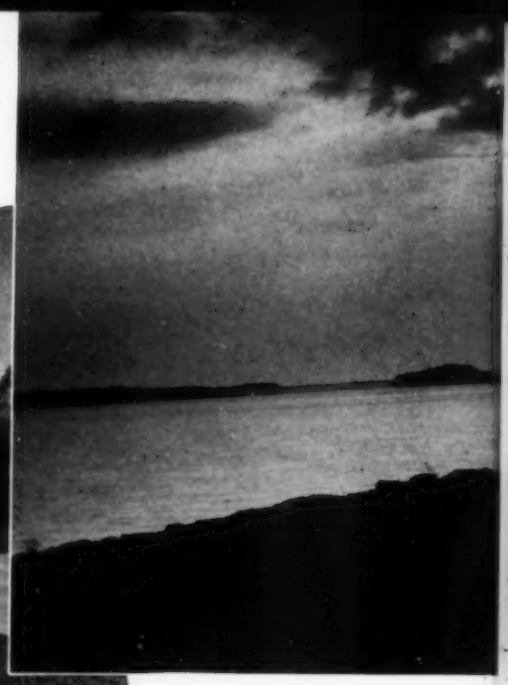
Right: — Typical over-pass making for safety.

Lower right: — Traffic grade separation at the western entrance to the City of Toronto.

Below: — Arterial connection for the new Rainbow Bridge at Niagara Falls.







Safety, speed and comfort are the guiding principles in Ontario's highway-building plan. Dual highways (top) eliminate the hazards of night driving. Complete traffic separation (right) combines beauty with safety.

MODERN - H
FACILITATE ACCES T
SCENI H

The advent of highways has a rehabilitating influence on rural communities (lower left). Forty-foot paved highways such as this (top) ensure comfort. Boulevards enhance the beauty of the native habitat (left).

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be considered from time to time as conditions permit. A departure from common practice here applies. While incandescent will be the standard type of illumination, sodium vapour will be used at intersections; this variation in colour serving to identify cross-roads at night some time before they are actually reached. Bridges are also given special treatment, varying from flood-lighting to ordinary street practice, dependent upon location. Especially will consideration be given to identifying entrances to suburban centres, electric and reflector signs giving suitable warning well in advance of the points of departure from the roadway.

At the time of purchasing property for the right-of-way, provision was made that, as far as possible, entrances to the new highway would not be permitted except by license. In certain instances, such as the approach to Toronto, a "freeway" will apply for the first three and a half miles beyond the city limits, where entrances even under license will not be permitted. In several other sections, particularly adjacent to cities, the same rule will be in effect. We believe that the prohibition of local use of the highway for some distance beyond the urban centre is desirable in that it relieves and prevents congestion.

When completed, the road from Toronto to Fort Erie will be ninety-one miles in length, nine miles shorter than the old road serving between these points. It will be of cement concrete, four-lane construction, with the driving lane eleven feet in width, the passing lane one foot wider. Separating the motorways will be a grassed area thirty feet in width. The shoulder of the roadway, fifteen feet in width, permits of temporary parking in case of repair to a car becoming necessary. At the commencement of the work on this highway, land values forced the use of narrower rights-of-way and, consequently, affected the widths of centre grassed area sometimes to such an extent that only five feet were obtained. However, even this limited strip has proved its worth and plays its part in accident prevention.

While safety has been the keynote in the development of Ontario's first divided highway, it is not the only feature that received consideration. Graceful sweeping lines take advantage of topography and local countryside, the beautiful gardens west of Toronto touching the shores of Lake Ontario and Burlington Bay. Through Canada's fruitland to the waters of the magnificent Niagara River and its awesome and well-known Falls, the road passes, ever unfolding to the view of the traveller. Locally, he is pleased that roadside embellishment can become a reality, sodded slopes, planted boulevards (which will eventually become a positive defence against light glare for night driving) blend into permanent structures of concrete and steel artistically moulded into the landscape.

West of St. Catharines one passes over the Welland River, the location of the first canal between Lake Ontario and Lake Erie. It was near this spot that Their Majesties opened the road as the Queen Elizabeth Way. Identifying this occasion, an inscription on the Henley Bridge reads as follows:

Below left: — Projected high-level bridge, Burlington Beach Canal.

Below right: — Proposed Rainbow Bridge over Niagara River.

Day and night scenes of the Queen Elizabeth Way typifying provision for safe travel.

Niagara Falls under floodlight.

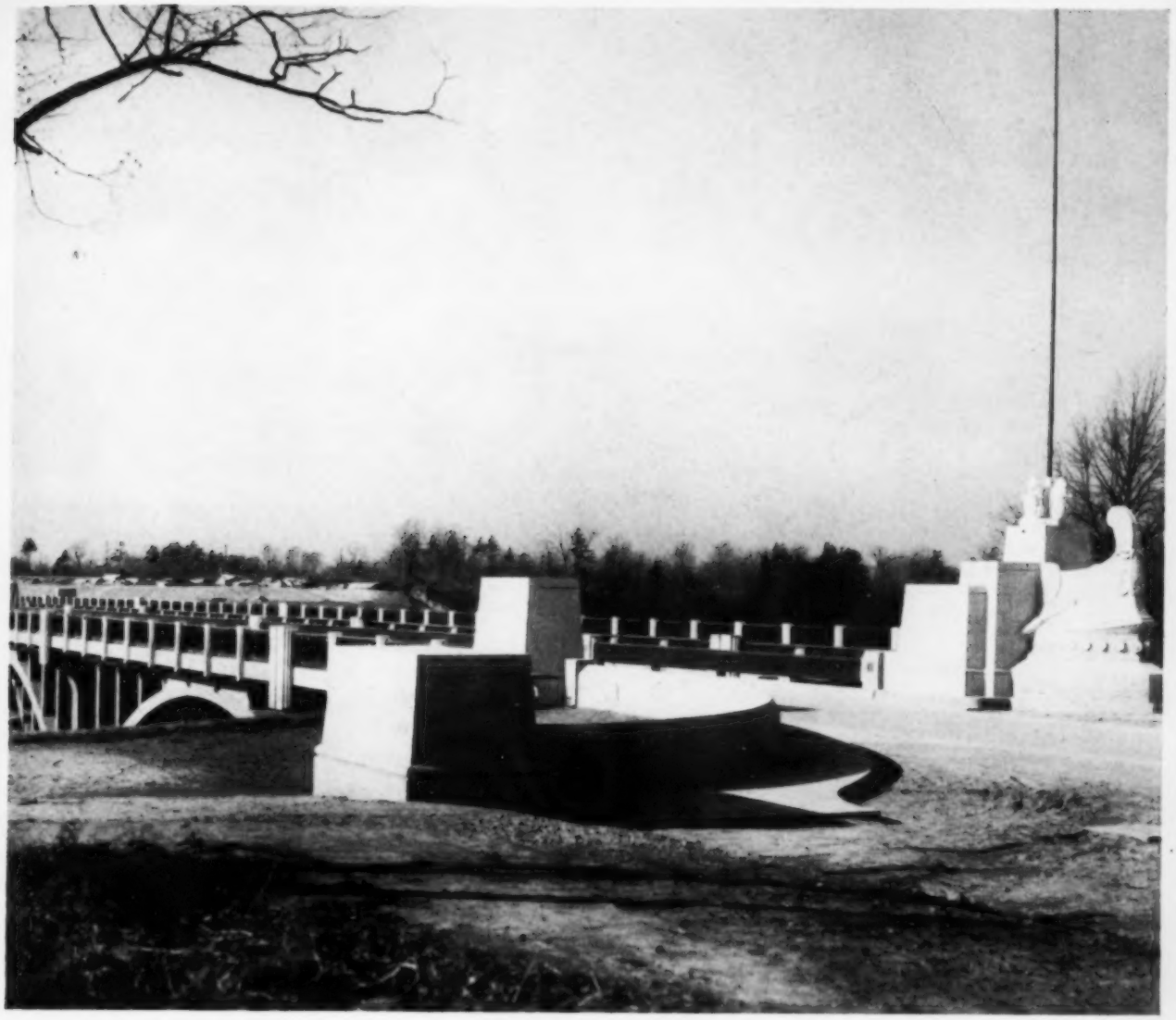
Such engineering devices as the cloverleaf construction provide safe and uninterrupted movement at heavily travelled intersections.

Dual bridges separate traffic flow.

Royal crest.

"The Henley Bridge was opened by Their Majesties, King George VI and Queen Elizabeth, on the 7th of June, 1939, and commemorates the first time a reigning sovereign has entered one of the sister dominions of the British Empire."

To commemorate the occasion still further, the Province of Ontario has incorporated into the design of the bridge over the Welland River, known locally as the Henley Bridge, the crests of Canada's provinces as well as that of Britain's royalty. Carved in stone making up the prow of a ship breasting the oncoming waves, the crests of the provinces symbolize unity, sturdiness and progress. The entire



Approach to Henley Bridge.

structure is somewhat unique in design. Handsome in appearance, it adds much to the view from the Canadian Henley course.

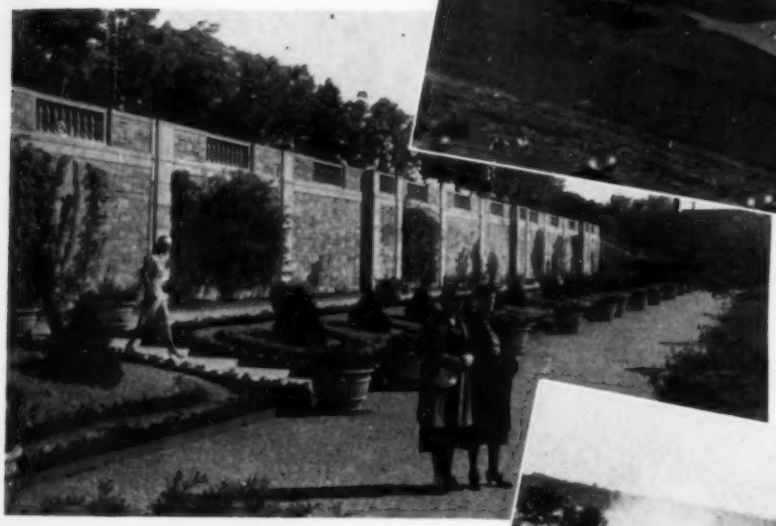
At the time of writing the road is under construction from the City of Toronto limits to Brown's Line, a distance of three and a half miles. This section, it is expected, will be finished this summer. From here to Burlington the work is completed. Beyond this point to Niagara Falls grading has been done, structures are in place, and the road gravelled. Between Niagara Falls and Fort Erie very little work has been done. Although contracts are awarded, actual starting has been delayed due to war conditions.

A decorative feature on the Henley Bridge.

View of Niagara Falls as seen by Her Majesty Queen Elizabeth, on her historic visit, June 7, 1939.

Glimpses of beauty spots in Niagara Falls Park System which invite visitors from all parts of the world.

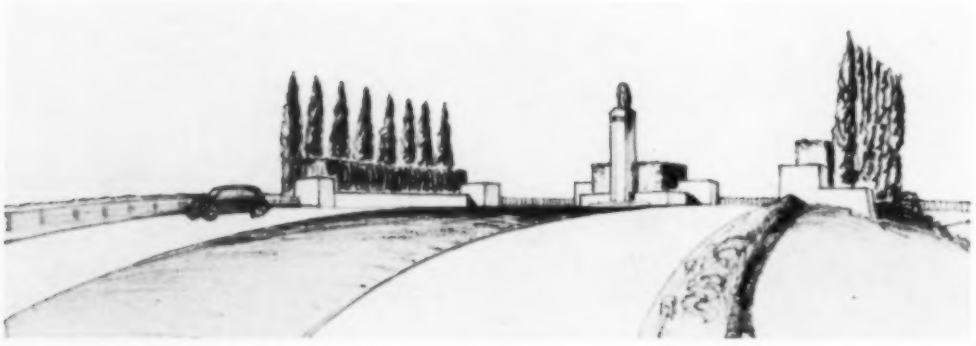
Striking view of the Canadian Falls — famous historic site — as seen from the escarpment.



View of Queen Victoria Park (bottom centre), and scenes in Oakes' Garden Theatre.

Unfortunately, a traffic tie-up often occurs at Burlington caused by the ship canal crossing the highway. Navigation of this waterway will continue to delay highway movement until such time as the present bascule structure is replaced by a high-level bridge.

The Province of Ontario believes its principal highway will attract many thousands of tourists to our country, the location of the road tapping, as it does, the Niagara district and its beautiful park area stretching from Lake Erie to Lake Ontario, thirty-two miles in length. America's vacation centre, over 2,000 acres in extent, lies along the Niagara River, magnificent in splendour, rich in historical interests and known throughout the civilized world as an unfortified International Boundary where millions of Americans pass to and fro as readily as crossing a state line. Records indicate that close to fifty per cent of Canada's visiting population cross the border in this area. What part the new highway will play in adding to these figures is difficult to estimate. Ontario is proud of the sections of this road that are completed. Even greater justification for pride will apply when the highway is finished. A vision in its early stages, the road will eventually become a reality. Engineering skill, executive farsightedness and a will to achieve, plus a loyalty to our Queen, gives Canada its first dual highway, the Queen Elizabeth Way. While the War will, of necessity, delay the finishing of this great project, an appreciation of increased international business will, on the other hand, tend to encourage the providing of funds to permit of its completion. The longest continuous divided highway built to date, open for year round traffic, safe and dependable, winter and summer, it is an open door to Canada and its great resources. With over 700,000 registered motor-cars now owned in this province, Ontario has moved a long way as a road builder since the first road commission was formed a little over twenty-five years ago.



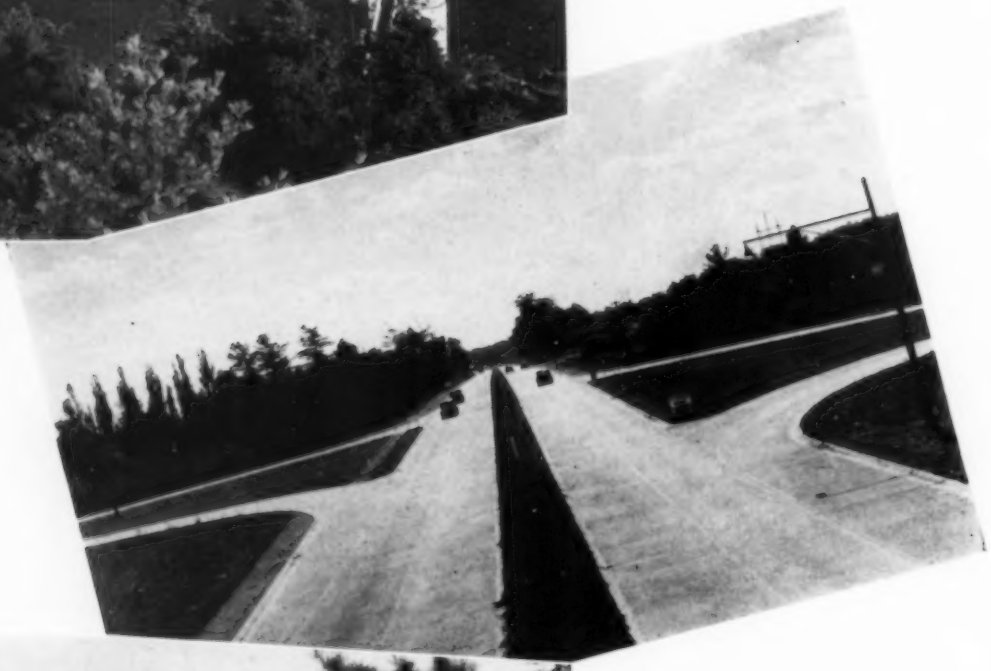
East approach, Queen Elizabeth Way, Toronto, Ontario.

Drawbridge.

SCENES AT HISTORICAL FORT ERIE.

Sentry on guard.

Breezes on Lake Muskoka.



QUEEN ELIZAB
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Camping facilities such as these adjoin northern highways.

Approaching Algonquin Park playgrounds.

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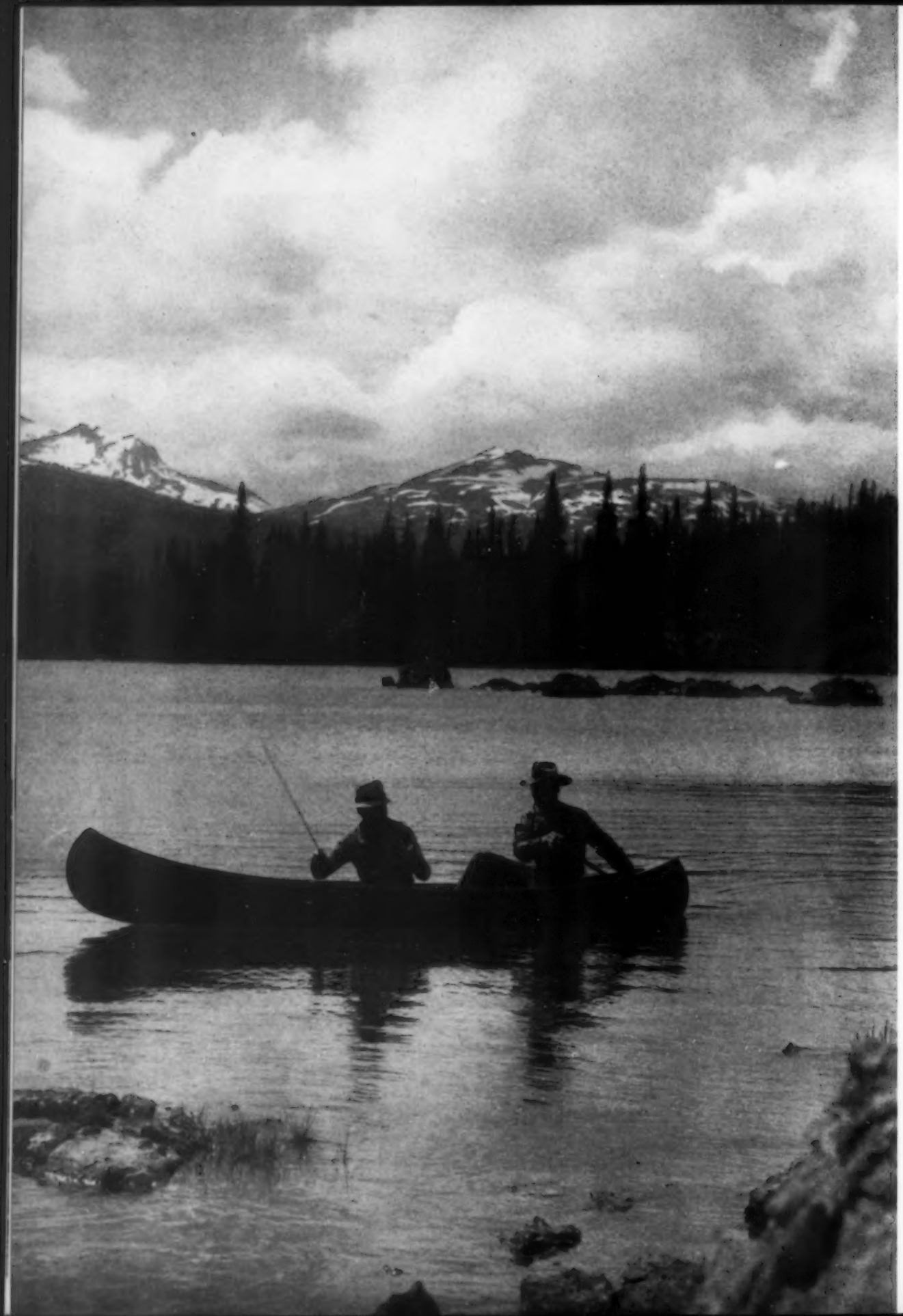
Typical scene in Ontario's hinterland.



SPORT FISHING IN CANADA'S NATIONAL PARKS

by **D. S. RAWSON**

'Of recreation there is none
So free as Fishing is alone;
All other pastimes do no less
Than mind and body both possess.

My hand alone my work can do
So I can fish and study too.'
"The Angler's Song"—Izaak Walton.

IF the modern angler is not always so philosophical as the gentle angler of Walton's time, he is still heir to the same tradition. He too communes with nature and takes a keen delight in matching his wits against the wiles of the fish. Such recreation is one of the chief attractions of the national parks of Canada, great natural areas which are dedicated to this purpose and to the preservation of wild life.

Our Canadian parks offer the angler a great variety of game fish. In the western mountains there are no less than six species of game trout. The fighting rainbow, the cutthroat, and the eastern brook or speckled trout are highly prized by most anglers. The great lake trout, the Dolly Varden, and our European friend, the brown trout, add variety and interest to the group. In the parks of the prairie region the lake trout, the pike, and the pickerel or wall-eyed pike are plentiful. Travelling eastward you reach the waters of the small-mouth bass, the giant maskinonge, and the brook trout — fine fighters all. In the Cape Breton Highlands, the most recent addition to the national parks, are the famed Atlantic salmon, the brook trout again, and in the sea, the giant swordfish.

The anglers are as varied as the fish. There is the aristocrat among anglers, the orthodox fly fisherman, a master of the delicate tackle and versed in the high creed of fly fishing—a trifle haughty perhaps, but a good sportsman keenly interested in nature and its conservation. He limits his catch and glories in the fight rather than the poundage he carries home. One would hardly expect a widespread development of fly fishing in a young country, yet our experience among anglers indicates that the tradition is gaining ground.

Bait fishing has also its many enthusiasts with methods less orthodox but not necessarily less skilful than those of the fly caster. Most of us, however, possess no great skill in any method. We are content with "just fishin" whether it be trolling for pike or dangling a worm for the eastern brook trout. Perhaps we may be more proficient in the delicate art of browning a fish in the pan. Each to his own skill and welcome, for the national parks have fish and fishing for all.

Waterton Lakes Park in the southwest corner of Alberta is a small area in which are concentrated some of the finest lakes and most colourful mountains of the Rockies. Among the opportunities for fishing in this park the trip to Crypt Lake is unique. The trail follows Hell Roaring Creek for seven miles, passing two magnificent waterfalls. Then, after skirting a precipitous rocky ledge, it passes through a fifty-yard tunnel into the "crypt". From the icy waters of the lake the fly fishermen take an abundance of fat cutthroat trout. Equally fine and more accessible are Bertha Lake with rainbow up to seven pounds, and the Alderson-Carthew series teeming with smaller cutthroat. In the latter group even the beginner may catch his limit in a few hours' fishing. An excellent highway runs to the shore of Cameron Lake where rainbow and eastern brook are numerous. At least fifteen other lakes and half a dozen streams provide mountain trout of several species. Trollers in the main lake near the townsite catch lake trout, a recent capture weighing forty pounds.

To choose the angling highlights of Banff National Park is no easy task. Its area of 2,585 square miles is dotted with lakes and streams. There are about 150 larger lakes and twenty streams which produce fish. Undoubtedly the most exciting angling falls to the fortunate person who can take a day or two hiking or riding the mountain trails, camping by the way or stopping in the comfortable cabins and chalets. On such a trip he may fish in Baker Lake and others of the Ptarmigan-Skoki area east of Lake Louise, in Marvel

Left:—Fishing in one of the numerous bays of Maligne Lake, Jasper National Park.

Lake at the foot of Mount Assiniboine, or in Egypt Lake near the Simpson Pass. In all these lakes the cutthroat are big and active, well able to test the fly-fisherman's skill.

For a shorter trip one may drive to Vermilion Pass west of Castle Mountain and hike in to Boom Lake. Here is a sanctuary which for many years has rarely failed to provide a limit catch of small trout, just the right size for the pan. Almost within the Town of Banff lie fishing grounds such as the Spray River and Vermilion Lake. Here the cutthroat, Dolly Varden, and eastern brook exhibit the wariness developed by persistent fishing and only the experienced angler can capture them. Large lake trout are caught by trolling in Lake Minnewanka, seven miles from Banff up the valley of the Cascade River.

The completion of the Banff-Jasper Highway now provides access to the northern waters of the park. From Lake Louise it runs north past Hector and Bow Lakes, over the summit of Bow Pass, and down into the valleys of the Mistaya and North Saskatchewan Rivers. The Mistaya and Waterfowl Lakes were prepared in advance by stocking with cutthroat trout. Cirque and Chephren Lakes, hidden in the heavily wooded mountain valleys, provide rainbow fishing for those who can find their way along unmarked game trails.

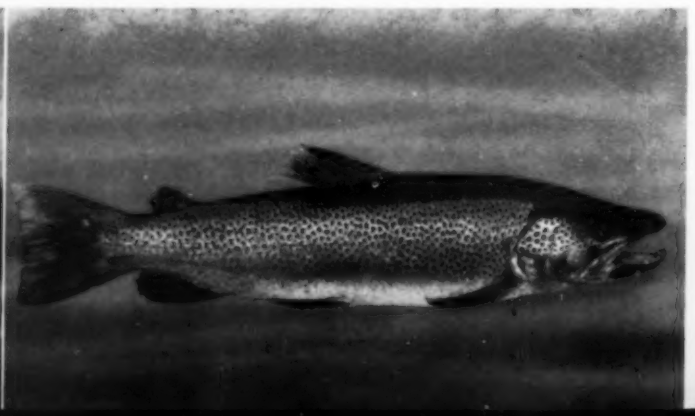
So outstanding is the scenic beauty of lakes in Yoho National Park that the fishing they provide is often overlooked. Lake O'Hara with its rainbow trout is a gem to the angler as well as to the artist. Emerald Lake, and Wapta Lake in the valley of the Kicking Horse River, provide several species of game trout. Few, if any, Canadian lakes can compare with Lake O'Hara in this unusual combination of scenic beauty and excellent angling.

The fame of Jasper National Park as a fishing area is already widespread and rightly so. Nowhere else have we seen such a fortunate location of fishing waters. A dozen fine fishing lakes lie within three miles of the Town of Jasper and many others are near the Banff-Jasper and other highways. Rainbow, cutthroat, brown, and lake trout are thus within easy reach of the angler. The successful introduction of eastern brook trout into the Maligne Lake system is a high point in the history of Canadian fish culture. Here, after a fascinating day's trip by car, boat and trail, you reach the sanctuary of Maligne Lake with its comfortable chalet and camps. According to his skill and desire, the angler may choose between fishing in the lake, in the swift waters of the Maligne River, or in the small but unbelievably productive Beaver Lake which drains into Medicine Lake. The speckled or eastern brook trout is now thoroughly established in its new environment. It maintains itself without help from the hatchery, grows to a good size and is ready either to give the fly fisherman a good fight or to take the bait of the humbler amateur. Amethyst Lake in the famous Tonquin Valley provides another rare combination of landscape and fishing. Here the rainbow (Kamloops) trout are most plentiful, the accommodations are good, and the only need is for more anglers.

Prince Albert National Park lies in the broad, wooded zone which cuts obliquely through the centre of Saskatchewan. It is dotted with lakes, all of which contain fish. The lake trout, the great northern pike, and the pickerel bear the brunt of the fishing, and whoppers of twenty pounds or more are not uncommon. Trolling and bait casting are excellent in the lakes and rivers. The National Parks Bureau has made definite progress in adding another game fish, the small-mouth black bass, which will provide both fly and bait fishing.

Bottom left:—A five-pound female black bass, one of the original breeding stock at Waskesiu Lake.

Bottom right:—A seven-pound brown trout from Lake Annette, introduced from Europe.



A seventeen-pound lake trout from Crean Lake, Prince Albert Park.

Whitefish, the most prized commercial and food fish of the north, is made available to the tourist by a carefully controlled fishing concession at Waskesiu Lake.

Clear Lake is the centre of fishing interest in Riding Mountain National Park. Here extensive efforts are being made to replace the pike with rainbow trout. This species is expected to thrive in the excellent water of Clear Lake; there is already some evidence that it is establishing itself.

Famous among the game fishes of Eastern Canada are the small-mouth bass and the giant maskinonge, both rivalling the mountain trout in popularity among sportsmen. Georgian Bay Islands and St. Lawrence Islands National Parks in Ontario provide fishing for these species in their native waters.

The Cape Breton Highlands National Park in Nova Scotia makes an unique contribution to Canadian sport fishing with its Atlantic salmon, eastern brook trout, and swordfish. Among the old school of fly fishermen nothing quite compares with casting for the salmon. The Cheticamp River, a salmon stream, lies within the park and the famous Margaree has its source at the southern boundary. On the eastern shore, swordfishing offers exciting possibilities. Fleets of swordfishing boats go out from the picturesque ports of Ingonish and Neil's Harbour.

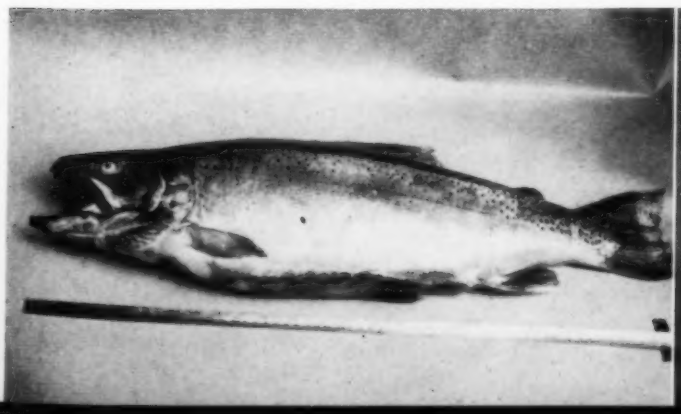
Several of the small lakes and ponds in Prince Edward Island National Park contain brook trout, and afford opportunities for angling, as do a number of streams outside the park. Deep-sea fishing is also available in coastal waters.

The angling in the national parks has been described above in glowing terms. Undoubtedly they do include much of the finest fishing waters in the Dominion. Let it not be assumed, however, that every lake and stream has game fish ready to flip into the pan or that the present fishing has been achieved without labour. Behind the scenes lie many problems of fish culture and planning.

In former years fish culture was thought of as collecting eggs, rearing and planting the fry. This was to be expected for the pioneer hatcheryman had to deal with many lakes barren of fish and others where over-fishing or lack of natural reproduction made planting desirable. At the present time some phases of fish cultural practice are being seriously questioned, but let us give full credit to the work of the hatcheryman in stocking new lakes and preparing for the opening up of new fishing areas. More than one-third of the lakes now producing fish in Banff

Bottom left:—A magnificent rainbow trout from Patricia Lake. It weighed nine and one-half pounds, was two feet long, and brilliantly coloured.

Bottom right:—Eastern brook trout from Buck Lake near the Banff-Jasper Highway—so fat it practically fills the frying pan.



Park were originally barren, and some of these now provide the best fishing. Mention has already been made of the phenomenal success of introducing eastern brook trout into the Maligne area at Jasper.

In the Banff hatchery more than two million young fish of half a dozen species are reared annually for distribution in the park and in adjacent provincial waters. Fish planting in mountain lakes is a man's job. The fry are loaded in cans before daybreak and taken by the hatchery truck to the beginning of the trail. There they are transferred to waiting pack-horses for a long ride over rough mountain trails, over high passes, and sometimes through forests with no trail. The pack-horse is not always sympathetic, and the water sloshing in the galvanized cans has alarmed even these seasoned veterans of the trail. On such occasions a few thousand fry may be treated to a brief and violent interlude and arrive at an unscheduled destination. It was under such conditions that areas like the Mistaya Valley were stocked at least two years before the new roads made the country accessible to fishermen.

But good hatchery practice is not enough. Fry planting does not always compensate for overfishing and it offers no solution for waters in which the coarse and predatory fish have taken the upper hand, crowding out the game fish. The success of fish planting must depend also upon the choice of suitable waters for the particular species, the frequency of planting and the time of opening the waters to fishing. In many cases the problem is that of conserving native species, preventing the mixture of species, and undesirable hybridizing, or even modifying the natural conditions such as water flow, breeding grounds, or food supply. All of these and many other problems confront the administrator of fishing in the national parks. Where shall he seek for information and guidance in order that the capacity to produce game fish shall be utilized to the best advantage? Unfortunately the science of water culture ("aquaculture") is by no means so well advanced as the sister science of agriculture. However, the need for such a science is now recognized and efforts are being made to obtain a sound basis for what may be termed fisheries manage-

Top left:—Bass fishing waters in the Georgian Bay Islands National Park, Ontario.

Centre left:—The Kicking Horse River near Field in Yoho Park.

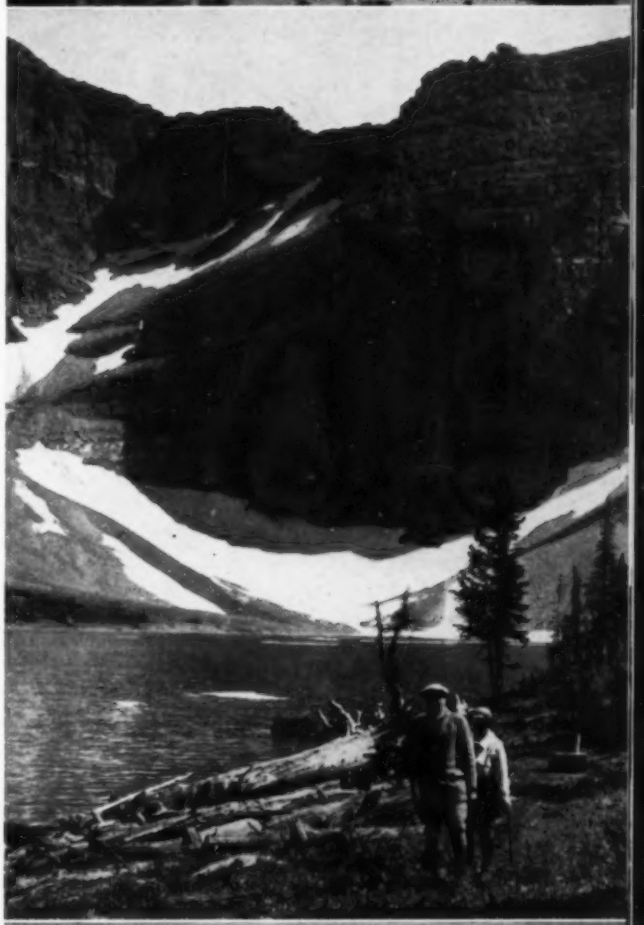
Bottom left:—Waterton Lake from Mount Crandell, looking south across the International Boundary. Lake Linnet lies in the foreground, Waterton Park Townsite to the right.

ment. The first step is the biological survey, a stock-taking of the present conditions and the future possibilities of each park. Such surveys have been made in at least five of the western parks.

The biological survey is an attempt to investigate the various conditions which affect fish life. In a general way these may be grouped as physical factors, food conditions, and fish conditions. Physical and chemical conditions include such influences as depth, water temperature, dissolved oxygen, and the penetration of light. The potential sources of fish food are the microscopic plants and animals throughout the water and the somewhat larger animals on the bottom of the lake or stream. Finally the fish population must be examined as to kinds, numbers, sex, food, rate of growth, and parasites.

The first problem which confronts the investigator is the provision of some means of transportation which will carry him and his various instruments. On mountain lakes this is often a difficult matter, and he is often forced to ride on rafts of varying degrees of seaworthiness, one and two man capacity, sometimes with crude oars. On lakes above the timberline it is necessary to resort to rubber boats or makeshift rafts of inner tubes.

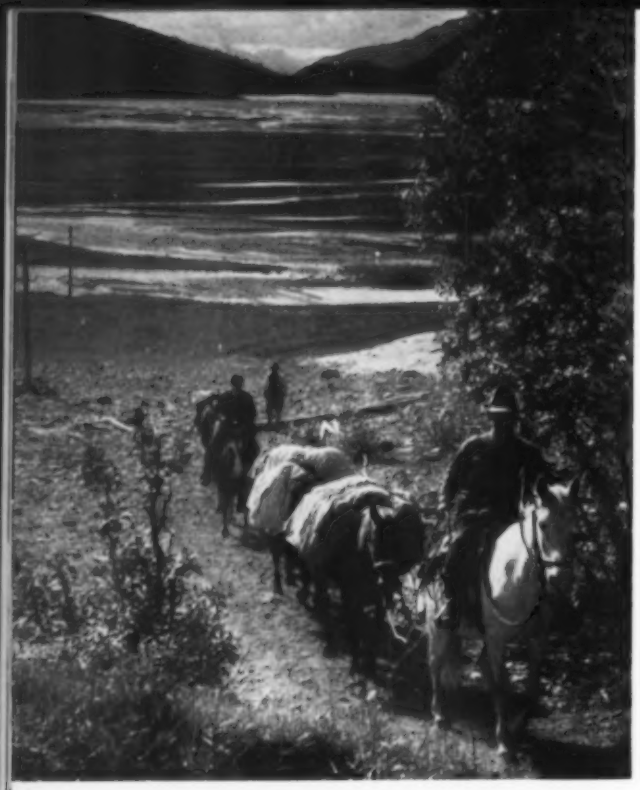
Once on the lake, depths are measured and temperatures recorded at various depths with a deep-sea thermometer. Lake temperatures are often peculiar in showing a marked stratification. Thus there is a warm upper layer, a thin middle layer in which the temperature drops suddenly, and a large body of cold water near the bottom. This condition interferes with the work of the wind in circulating the lake water and may result in a scarcity of oxygen in the deep water. Oxygen is, of course, vital for fish life, and such a scarcity may eliminate certain game fishes. This is illustrated in Prince Albert Park where Waskesiu Lake produces no lake trout, although they are abundant in Kingsmere Lake which flows into Waskesiu by a mile of open stream. The difference between the two lakes is that Kingsmere has an abundance of oxygen in its deeper water while Waskesiu has very little at certain seasons.



Top right:—Emerald Lake with its attractive chalet.

Centre right:—Crypt Lake, with floating ice on July 10th. High mountains practically enclose the lake.

Bottom right:—Marvel Lake at the foot of Mount Assiniboine in Banff Park. An early morning view of this beautiful lake where the large cutthroat are abundant.



The biological survey packs its instruments and equipment into Maligne Lake, Jasper National Park.

Light is also a necessity in a lake, for the minute plants in the water use it in the manufacture of foodstuffs. Thus light penetration is an important measurement made by the simple expedient of lowering a white disc into the water until it disappears from view. In a clear lake, this disc, about the size of a dinner plate, can be seen to depths of more than fifty feet, while in a heavily silted, glacial lake it sometimes disappears at eight inches. Such variation in the penetration of light makes a great difference in the production of food and, therefore, in the production of fish. To expect any amount of food production in a lake like Mistaya in Banff Park is like trying to grow vegetables under heavy shade. Where the plants are scarce, the little animals can find no food, and the fish feed chiefly on insects which drop in around the shore.

Testing the food supply in a lake is not merely a matter of observing insects, shrimps and other animals near shore. The most significant kinds of food are the almost invisible microscopic plants and animals which are found in the open water and at all depths. These organisms, known collectively as plankton, are collected with a net of fine silk bolting cloth, 20,000 meshes to the square inch. This net is drawn along the surface or vertically from the bottom to the surface and it may be closed at any depth to test the food supply. Collecting the plankton is much easier than analysing it, for each sample contains hundreds of kinds of minute plants and animals which must be examined under the microscope. A few plankters such as the larger waterfleas and the red copepods are large enough to be seen with the naked eye and the stomachs of mountain trout are often gorged with them. Practically all young fish and minnows feed on plankton, and even some larger fish are able to collect it efficiently.

Many fish feed on shrimp, snails, immature insects, and such organisms which live on the bottom of the lake or stream. The experienced angler is well aware that the best fishing for game trout is often at the time when the insect larvae are maturing, rising to the surface and emerging as adults. To test the abundance of this kind of food another tool is needed, a box-like dredge which brings up a square foot of bottom mud and its animal population. The animals are recovered by the laborious process of washing all the mud through fine screens of three sizes. Many samples are taken in each lake, and from the average populations at different depths an estimate of the potential food supply is reached.

The fish are also sampled, usually with test nets, and such samples are supplemented by the catches of anglers who are usually most willing to co-operate. In fact our sampling observations are always a matter of popular interest. When we pull a nine-pound rainbow from Patricia Lake the visitors gather to look on with envy, but when we are examining the stomach contents of 268 suckers caught in a single net in Pyramid Lake they are likely to leave us to the company of the flies and gulls. Only by the painstaking measurement of many fish, microscopic examination of their scales to determine age, examination of sex, parasites, stomach contents, etc., can we understand the living conditions in the fish population, diagnose their ills and make recommendations for their future welfare.

This, in brief, is our method of attack for obtaining the pertinent data about a lake from the viewpoint of fish production. Streams are in many respects more difficult for their water flow varies, the fish tend to migrate, and the food supply varies greatly at different seasons. Mountain streams are particularly severe with their cold water, sudden freshets and shifting, rocky beds. A few deep holes to

shelter both the fish and their food organisms are most important, so important that the fish culturist has found it worth-while to create such shelters by building "V" dams and other structures. Preliminary tests of these stream improvement structures have been made in Pass Creek (Blakiston Brook) in Waterton Park. It is hoped that this practice, along with the planting of larger fish, may greatly improve the angling in our mountain streams.

When the field party packs up in September the job is by no means finished. All the records of depth, temperature, and oxygen, all the samples of plankton and bottom animals, all the fish and their scales and stomachs must be taken back to the laboratory for the final analysis. This usually takes as long as the field work, and even then many problems go unsolved for "aquaculture" is a new science, and we need not only practical surveys but much intensive research. Thus such urgent problems as the possible improvement of fish stock by scientific breeding, the life histories of various fishes, and the question of what to do with heavily silted lakes, must await further study.

When the information is all organized, it is possible to provide the administrator with a reasonable plan for the fish culture or fisheries management of the area. Such plans are by no means final, and they must be tested as they are put into practice. The biological survey is not the end but merely the beginning of scientific "aquaculture". On the basis of such surveys the national parks have made the now famous introduction of eastern brook trout into the Maligne area. Further introductions, now in progress, involve the black bass in Prince Albert Park and the rainbow trout in Riding Mountain Park. The management of fish populations thus established, or of fish native to park waters, must be based on the application of scientific knowledge.

It is recognized by all concerned that the business of fisheries management is a difficult and time-consuming task. The hatchery superintendent is already fully occupied without spending much of his time in the field, studying the result of his planting. In the future we may expect a new vocation, that of the fisheries manager. He, in addition to a sound training in hatchery practice, must have the time and ability to apply and test the recommendations arising from the biological survey. In this field, also, the national parks have been active, arranging special training for officers of their staff who are to become pioneers in the field of fisheries management.

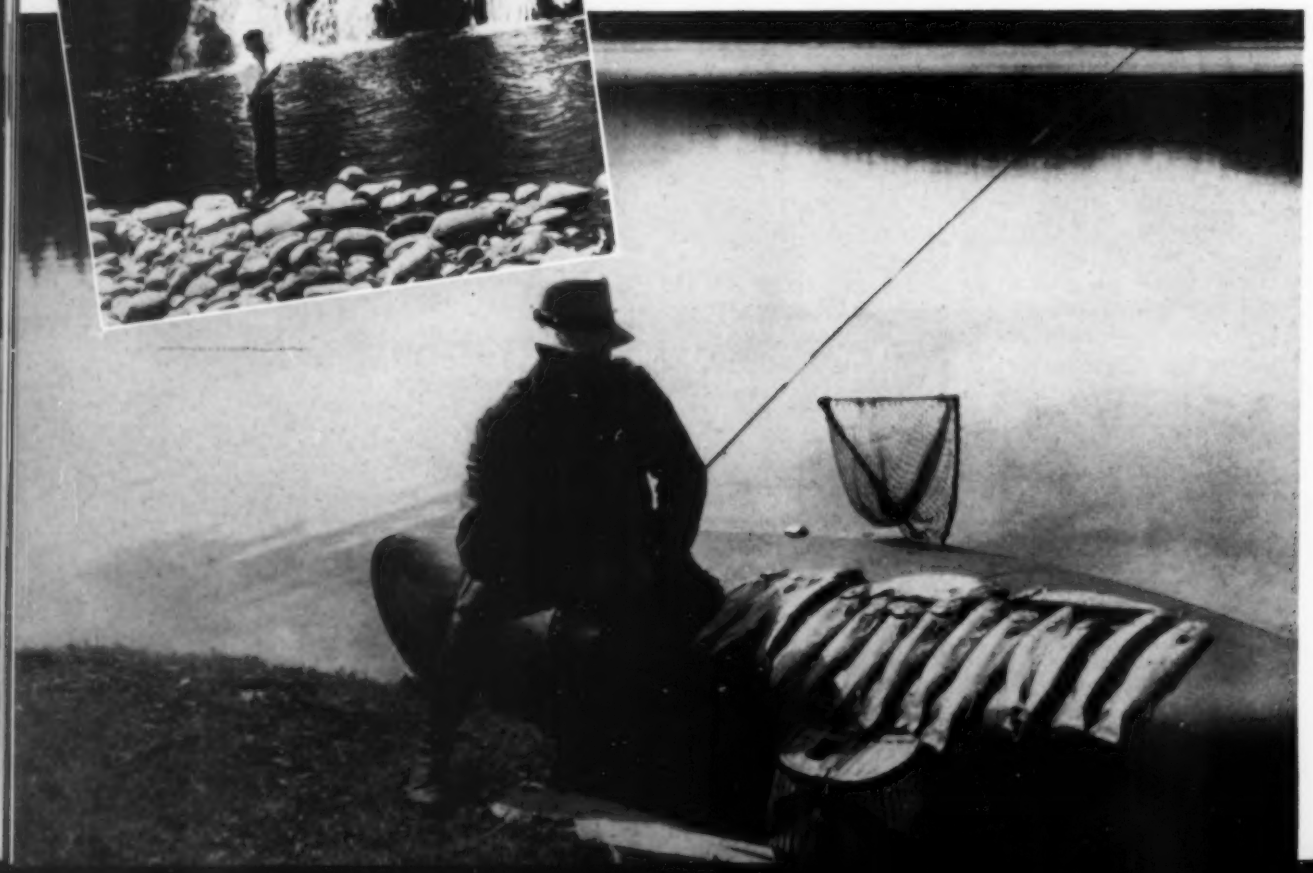
Our national parks are fortunate in the possession of those first essentials for good angling, innumerable lakes and streams, and excellent native game fishes. With the fish culture service doing its bit, and with a careful yet progressive administration, we may confidently expect that the lakes and streams in Canada's national parks will continue to provide angling unsurpassed by any on the continent.

The Banff hatchery where two million game fish fry are reared annually.

Above:—Glacial-fed lakes in the Canadian Rockies furnish wide scope for dry fly enthusiasts.

Left:—Fishing at Mary Ann Falls, Cape Breton Highlands Park.

Below:—A two-man catch of eastern brook trout from Maligne Lake.



Above:—The author with a catch of rainbow trout from Lake O'Hara.

Right:—Fly casting below Cameron Falls, Waterton Lakes Park.

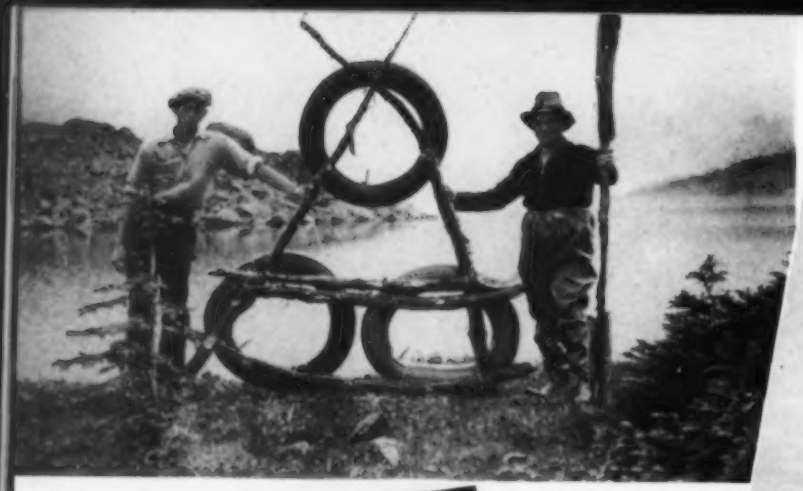
Below:—Reeling in! An exciting moment in the angler's day.

Amid the peaks and pines. A tumbling stream which abounds with speckled trout.

Beaver Lake in the Maligne Valley. A small lake which produces a remarkable quantity of eastern brook trout.

Waiting for a strike! A fast stretch on the Spray River.

Bow Lake with its glacier, and Mount Thompson. This is the source of the Bow River which drains a large part of Banff Park.



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1.—A primitive pneumatic raft on Carthew Lake, above timberline, Waterton Lakes Park.

2.—The silk bolting cloth net (20,000 meshes to the square inch) used in collecting the microscopic plants and animals from the open water.

3.—A few of the 80,000 bass fry reared at Waskesiu Narrows in 1936.

4.—A "rubber doughnut" on Two Jacks Lake, Banff Park.

5.—Removing the bass fry from their artificial nests for distribution.

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1.—Screened enclosures for rearing bass at The Narrows, Waskesiu Lake, Prince Albert Park.

2.—This "V" dam built to improve the shelter for fish in Pass Creek, Waterton Lakes Park, weathered the greatest flooding experienced in many years.

3.—Suckers and more suckers in a net from Lake Linnet, Waterton Lakes Park.

4.—Dredging on Lac Beauvert, Jasper. The costuming speaks eloquently of the climate.

4

The turbulent Maligne River in Jasper National Park provides the ultimate in speckled trout angling.

The turbulent Maligne River in Jasper National Park provides the ultimate in speckled trout angling.

Fly casting for Kamloops trout in the upper reaches of the Astoria River. This stream drains Amethyst Lake in Tonquin Valley, Jasper Park.

UNKNOWN HONDURAS

by **CHRISTINE INEZ VON HAGEN**

LAND was just visible in the early dawn as my husband and I stood on the bridge of the banana boat viewing our destination. Heavily wooded hills, tipped with the first morning sun-light, marched to the edge of the calm bay, and except for the oppressive, ever-growing heat there was no evidence that we were in the tropics.

We were excitedly discussing our plans when the Captain strolled up. "Well, there's Honduras which you've been so curious about," he said, "I told you before, there is nothing exciting about it—just bananas, and more bananas."

"But we don't expect to find a lost city or a tribe of 'white Indians'," my husband replied, "we'll be satisfied if we can turn up just one or two unknown things — even a new termite or those Quetzal birds I told you about."

Puerto Castilla is only one of several banana ports on the north coast of Honduras on the Caribbean Sea. It is built on a low sandy spit and except for the presence of coco-nut palms, and dark-skinned natives, could very well be any small American town, with its concrete bungalows grouped about a large club house. The commissary, a long, low structure, (where we filled our list of foodstuffs and bought additional camp clothes) was packed with banana cutters buying American products: cornflakes, flat straw hats, and cheap silk stockings. The manager told us that they had a monthly turn-over on American goods of $150,000. Castilla had been established in 1910 and was intended as the model for all future banana towns. Millions of dollars had been poured into it and into the banana land surrounding it, and in return, millions of stems of the fruit had passed through it to the United States; but now with the virtual exhaustion of the nearby banana lands, the whole project was being abandoned.

Across the bay is another ghost town, Trujillo, the original port of entry before the Fruit Company shifted all trade to Castilla. A captain in Cortez' ranks established it in 1530, and through the years it became a strong fortress and important shipping centre at the end of the old trail from the interior of Honduras and from Guatemala. When a subordinate threatened revolt to Cortez, he made his terrible trek from Mexico City through the marshes of Yucatan to Naco in Honduras to subdue him, and then proceeded on to nearby Trujillo.

In more modern times, William Walker, the American filibuster, captured and held the city, and in turn was executed and buried there. His grave still remains. In the cemetery are other old graves, overgrown with brush, of ancient Spanish adventurers, whose desire for wealth and excitement led them far from Spain. But now Trujillo has forgotten its turbulent past, and is only a collection of white-washed buildings and quiet cobbled streets dreaming in the tropical sun. The ruins of the fortress erected by the Spanish Conquistadores overlook the smooth bay. Standing by the ancient Spanish cannons that pointed toward the sea, I unconsciously scanned the horizon for sight of pirate vessels, just as the Spaniards must have done hundreds of years ago.

After only two days on the coast we took the train to Olanchito on our way into the mountains in search of the Quetzal birds. Mile after mile of banana plants, with their curious upside-down fruit terminating in a bright purple flower, slipped past us. Trainloads of the cut banana stems went by carrying the fruit to the waiting refrigerator ship in which they would be sent to the United States. The rather humid, luxuriant growth of the coast changed slowly to a more desert-like area in which strange climbing cacti and sharp-pronged acacia appeared among larger trees, but even at Olanchito, a small town at the very base of the mountains, where the soil was almost parched, great banana farms were being planted. I had always imagined that bananas just grew without any aid, but here in this dry area irrigation and cultivation were just as necessary as in any fruit orchard in California.

At Olanchito we waited for the Taca plane to take us to Yoro, the next step in our journey. It was less expensive to fly with all our equipment than to hire mules for the six-day trip. When the plane came in sight, the agent ran up and down

Left:—When the Quetzals had grown they were allowed to sit in branches of the aguacatillo tree.

Left:—A female Quetzal sits very quietly in my hand. This is the first picture ever taken of a matured Quetzal in captivity.

the pasture landing field frantically chasing off the cows until the pilot, after circling several times, brought down the Ford Trimotor safely. My husband and I, with a young American who was guiding us into the mountains, and six hundred pounds of our luggage, were loaded in between plows, chickens, and crates. The route was called the "meat run" and the plane was liable to pick up almost any kind of livestock or equipment from the isolated towns of the interior. In the interior of Honduras one travels by mule or by aeroplane, there is no "in between".

Once in the air we had our first realization of the Republic's terrain: rolling hills covered with pine and oak, intersected by deep gullies. During the forty-minute flight we saw not one house or village. The population of the country was apparently concentrated around a few small towns. Our studies and explorations would not be hampered by over-population!

Mules for riding and to carry our cargo of food stuffs, tents, beds, chairs, and collecting equipment met us at Yoro, and we left directly from the landing field, without entering the town, for Portillo Grande. Passing across level grazing valleys, through peaceful towns with their picturesque red tile-roofed houses, we gradually left behind the warmer lowlands and entered the mountains, and in a day and a half of riding at the slow but certain pace of a mule arrived at our destination—a tumble-down building set on top of a pass in the mountains. On one side we looked down a steep incline to the bottom of a canyon, and then our gaze wandered far out over the hills to the blue haze-covered valleys from which we had just come. On the other side of the pass were a few native huts and the continuing roll of hills. Here was to be our camp and here we would begin our search for the Quetzal bird for which we had made the journey to Honduras and to this isolated place.

While in the United States and in South America our interest had been aroused in the Quetzal bird. The interesting history and superstition connected with it had presented a challenge to us, and we believed that here was fertile field for study.

The Quetzal bird is famed in history as the sacred bird of the Mayas and the Aztecs. Only the ruling class were allowed to wear the beautiful green tail feathers in their head-dresses, and death was the punishment meted out to any one who wore them illegally or who killed the bird. Old Spanish manuscripts show that the vassal races paid tribute to the Aztecs with bundles of Quetzal feathers which were esteemed as much as gold. Both the Mayas and Aztecs sculptured the feathers of the bird into all their important stone work, and combined them with a snake to form the Plumed Serpent, the most persistent decorative motif in Aztec architecture. One of the more important Aztec gods, Quetzal-coatl, (Plumed Serpent) the culture hero who was responsible for many of the refinements of ancient American life, was intimately connected with the bird through its name. Undoubtedly the Quetzal was the most important bird in indigenous American life and perhaps had more influence on a people, directly and indirectly, than any other bird in the world.

As the population of Central America grew and with the Spanish conquest, the bird retired farther and farther into uninhabited sections of the rain forests until it became almost mythical, and English chroniclers, hearing of its wonders but never seeing it, recorded it among mythical animals, and a

legend grew up through the centuries that the freedom-loving bird would not live if touched by a human hand. The Republic of Guatemala to-day figures it on its escutcheon as a symbol that as the Quetzal cannot live in captivity neither can the Guatemalan. This was the bird that we had determined to study, to photograph, and, if possible, to send alive to the United States and London. Even modern scientists believed that it would be impossible to keep it in captivity, but at least we could study its natural history, about which little was known, and then continue our work by tracing the use of its feathers in Mayan sculpture.

My husband immediately went off up the steep muddy hill back of Portillo Grande into the rain forests above 4,000 feet elevation in search of the Quetzal. On the third day he returned triumphant with a long green-gold tail feather, proof that the birds were definitely there. On the next day he had his first sight of one as it sat quietly on a branch, almost over his head, and on that day, for the first time in history, the Quetzal bird was photographed. The question now was, "Had we arrived in time for the nesting season?" We did not expect to be able to handle adult birds, but hoped to raise the young ones. Victor had had experience with Trogons, smaller birds of the same family, in Mexico, and believed that we had arrived in season as he had planned. In his opinion the birds mated from May to June, but as the natives had no knowledge of the egg-laying time or even where the nests were located, we determined to move to a temporary camp in the rain forest to search for the nests ourselves.

Our mules climbed quickly up the mountain-side leaving the pine area and entering the damp region of the lower rain forest. At 5,000 feet we dismounted and walked through a typical jungle growth. The slim trees, festooned with hanging vines, grew straight toward the light without sending out branches until the crown spread out at the top, effectively cutting off all sun-light, and leaving a damp rottenness below. At the very top of the hill we came to an open space. Suddenly an Indian guide pointed ahead and exclaimed: "Quetzal!" I could see nothing until, as my eyes travelled upward, I descried a round hole, forty feet from the ground, in a decayed tree, from which extended a glistening green feather. There was no mistaking it; it was the long caudal tail plume of the male Quetzal. I waited breathlessly for my first sight of the bird and, with our approach, the feather disappeared and a green head appeared at the opening with only the smallest tip of a yellow beak protruding from under the crest. As we came even closer, the Quetzal left the tree and took an unhurried, undulating flight to a nearby branch from which it watched us while I tried to keep my eyes on it, as its green feathers actually melted into the foliage until it was almost indistinguishable. No wonder the Quetzal was considered one of the most beautiful birds in the world. Although about the size of a pigeon its body was heavily covered with iridescent green feathers except for a crimson breast. Its greatest glory, however, was the several long tail plumes, three times the length of the body, which flowed downward or floated gracefully after it in flight. As

Right: — Across the Rio Cuyumapa in the cool forest we set up a big net and allowed the birds to recover from the dizziness occasioned by their being carried on the backs of the Indians.

the sun-light struck the bird's plumage it turned from a deep blue-green to startling gold.

By great good luck we had discovered a nest on our first day, and the Indians soon built a temporary platform under the tree so that Victor might investigate it. I watched from below as he scaled the rickety structure, forty feet high, and reached down into the dead tree, and drew out his hand holding two blue eggs. We knew all we needed to know for the moment: It was nesting season. Word was sent out to all the semi-civilized Jicaque Indians of the mountains to search out, mark, and watch the nests while we ourselves settled down by the first nest for several days to observe the habits of the bird. During the whole day the male sat patiently on the eggs, usually with his tail hanging outward, but occasionally he turned to survey the forests. A common belief about the bird had been that he so valued his tail that there was an entrance and an exit to the nest so that he need not turn about inside and risk damage to his long plumes. It was apparent, however, that there was only one hole to the nest, which had probably originally been made by a woodpecker and then made deeper by the Quetzal to serve its own purpose. In the late afternoon the male flew slowly off into the woods in search of food and for an hour the eggs were unattended; then, just at dusk, the shadowy form of the female (a beautiful bird herself but lacking the long tail and crimson breast), appeared. She approached the nesting tree in short flights, looking about her carefully, and then, when sure that all was well, suddenly disappeared completely within the hole, there to warm the eggs during the night while her mate lingered in the forest.

Within a week we had word from half a dozen Indians, to whom we had promised a good fee for finding the birds, that they had located several nests, some with tiny, denuded birds in them. We instructed them not to molest the fledgelings until they were well feathered and able to stand by themselves. By this time we had pages of notes and had exposed photographs in spite of the almost constant rain. It was now time to return to our more permanent camp to await the first fledgelings.

We intended to remove the birds from their nests at 5,000 feet and bring them to Portillo Grande at 3,000 feet altitude as the first step in acclimatizing them to conditions which would eventually be directly opposite to their natural habitat of high, damp rain forests. In camp we prepared small cages covered with mosquito netting, gathered together all the avocados, eggs and bananas we could, and while waiting, spent our time collecting plants and insects. When we had word that the first birds were almost ready to fly we decided to remove them from the nest. We set out up the mountain again, arriving at one of the nests at dark. An agile native boy scrambled up the platform while we waited below with small baskets to hold the young Quetzals. First the boy flashed the light full in the eyes of the female Quetzal and she, dazzled by the light, made no attempt to escape when he gathered her in his hands and passed her below. Then he reached in and gently lifted out two fat, brown and grey, feathered nestling Quetzals. We were in possession of our first specimens.

Our first success seemed a signal and each day the Indians brought one or more birds down the hill. Some of them were well grown and almost ready to fly, but others were nearly without feathers for, in spite of our instructions, the natives were so anxious to earn their money that they removed them too soon. By the end of August we had nine birds to keep us busy at every moment. From the several baskets came a strange hissing sound like that of a too hot radiator letting off steam. It was the cry for food. When one group was fed another took it up. Their first food was ground, boiled corn mixed into a gruel and poured down their ever-gaping mouths. As they grew older we added chopped boiled egg, avocados, and bananas. The smallest birds were fed every fifteen minutes while the larger ones managed to exist for forty-five minutes without eating; it was a constant scramble to get the last fed before the others demanded nourishment. All the baskets, gourds, and cages were cleaned three or four times daily. Each bird was carefully watched to see how it digested its food. If one seemed "off his feed" he received a little mineral oil and by next day was completely normal and competing with the others to snatch at the food offered to them in a teaspoon. As the native food of the Quetzals is a small wild avocado we had thought to reproduce their diet as nearly as possible with the

cultivated variety of alligator pear and they took to it so readily that they spurned all other fruits until, realizing the cost of avocados in the United States, we tried to change them to bananas in case they should ever reach the Zoo, but by that time they were independent enough to refuse what they did not like.

At night the younger birds were covered with warmed cloths and placed in their baskets, which were wrapped in layers of cloths to keep out the cold and the marauding rats. The larger ones were able to sleep on perches in their cages with their heads tucked under their wings. Although the night brought an end to the constant demand for food and our anxiety over each bird's health, still we were often wakeful, rising to see that they were warm and quite safe. I remember one night we heard a rustling noise and found a band of "army ants" marching through, destroying every living thing in their path. These marauders arrive unexpectedly in thousands, completely clean out a house of living things and then depart. We hurriedly moved the birds to the tent. If those ants had ever reached our birds, especially the tiny ones, we would have had nothing but skeletons in the morning.

Even though we felt we were fairly successful so far, having kept the birds for several weeks, there was a constant strain and uncertainty to the work. One of us stayed with the birds every moment. Almost every day a bird would seem to hurt itself flying against the walls of the cage, or one would ruffle its feathers and refuse to eat all day, and we would anxiously fuss over it until it seemed more normal. We were never sure when some catastrophe might wipe out all our months of care.

When the birds were two months old we decided it was time to accustom them to a warmer climate and took them 1,000 feet lower to the Valley of Subirana. The seven-hour trip, on which they were bounced about, was something of a test, as they would eventually have to be carried out to the coast, two days away. They were pretty well shaken up, but soon recovered their equilibrium and, even though the temperature was higher in Subirana, our Quetzals seemed quite content. Three times a day we lifted each out of its cage (they were so tame they would jump readily to our finger), and placed them on the ground to run about. In free nature they never walk on flat areas, due to the peculiar placement of their toes which are made for grasping only, but we taught them to run along the ground after pellets of food. In this way they were exercised. If we forgot an exercise period we could easily tell by their restlessness and fluttering that they missed it. Every morning,

before their first meal. I gave them a few drops of cod liver oil in water to prevent rickets. We dug up worms and larvae for them to supply the insect food they needed. Occasionally they received a little chopped meat. In other words they were as carefully fed, cleaned and exercised as any child — only we had nine of them!

Our "dead-line" to get the birds out from the interior to the coast was the middle of October. The torrential rains were due. At any time the rivers would flood and it would be impossible to cross them for months to come. Whether the birds were ready for the long journey or not, we had to leave, and, taking a chance only until the first night of the full moon, we set out about midnight. Our plan was to pass over the mountains, cross the river (we crossed the same stream eight times) and arrive at a small valley town before eight o'clock in the morning. There we could rest during the heat of the day and then again go on to another town where we would spend the night, and by the following morning we would reach a railroad town. But, "the best laid plans" do not always work. By daylight of the first day we were still miles from our immediate destination. The birds were so cruelly knocked about in their cages by the jogging pace of their Indian carriers that we stopped every half-hour or so to rest them. By noon we were still plodding across the valley floor under a fierce sun. The miles stretched ahead endlessly with no town in sight. We ourselves were almost exhausted. The birds were completely collapsed on the floor of the cage, eyes closed, panting for breath. We were bitterly disappointed to think that these few hours of heat had destroyed all those months of work. Finally, well past noon, hot and tired, we arrived in the town. We quickly took the cages into a cool, breezy room and lifted the birds out on to the dirt floor where they lay as if dead. Not one could stand. We sprinkled them

Famous throughout the Aztec period as well as the colonial time, the silver mines of Honduras have operated now, for centuries. This mine, the famed Rosario Mine, is just outside of Honduras, and is operated by an American syndicate. It is perched on the side of the mountain. In the background is the valley of the Rio Chontales.

There are two ways to travel in Honduras, by mule or by aeroplane. The aeroplane is rapidly reducing the mule traffic.

with water, fanned them, and forced strong coffee down their throats for an hour before one and then others lifted their heads and moved tentatively about. I could have cried from sheer relief when almost all accepted food and fluttered their wings. We would not take such a risk again. There would be another sleepless night on mule back for us, and we waited until ten o'clock that night only to rest the mules before setting out on the trail which now led over mountain peaks. The birds, in spite of the jogging pace, became more and more animated in the cool air, and our spirits rose again. We still had the moon to light our way as, single file, silently, we wound over the mountain range. The long hours on mule without sleep began to tell on us, and I became so sleepy that I had to slap myself to keep from rolling off the mule. We reached the valley on the other side and civilization just before the sun fully rose. A car met us and soon we were in a house and had the birds out of their cages in front of a fan blowing over chunks of ice to keep them cool. Next morning, fortunately a rainy, cool one, (we were only a few feet above sea-level in a humid banana valley) we took our Quetzal birds by train to the port and there watched them sail out of the harbour for New York. Even then the natives would not believe we had Quetzal birds in captivity. The carpenter who built their big cage for the journey north exclaimed, "If you touch a Quetzal it dies. You pick these birds up on your fingers and nothing happens, therefore they are not Quetzals."

Nevertheless five days later came a cable from New York, "*Nine Quetzals arrive alive.*"

We felt quite sad when finally our birds were gone, but it was a carefree feeling to have nothing to watch or feed, and we started off on our next jaunt very gaily. While in Subirana we had heard rumours of an isolated tribe of primitive Jicaque Indians (unmixed like those we knew in Yoro) who lived in a stockaded village on top of a mountain in the centre of the Republic. Rather skeptically Victor took an eight-day mule trip to investigate.

He returned with plans made for our work when we were through with the birds. The Indians were there, more wild and uncivilized than we had thought possible of any tribe in Honduras. With the Quetzals safely away we went by train, by automobile, and by mule to the Montaña de la Flor (fifty miles from Tegucigalpa, capital of Honduras, but seemingly a thousand miles from everywhere) to the territory of the Jicaque Indians.

At 3,000 feet elevation in pine and oak-covered hills on the banks of the Guarabuqui River, we set up our camp only a half-hour from the village of the Jicaques. Our first night was spent in a pup tent, but by early morning we crawled out, half-frozen, to build a roaring bonfire. Obviously the warm sunny days were no criterion of the nights. That very day we set out on horseback to visit the retiring Indians with our half-Spanish guide who, with his family, was the only other inhabitant for miles around. Arriving at the lower barricade of the Jicaque village we dismounted while Lopez sent forth a re-echoing call for the chief. No answer. Again he called, and in a few minutes, wending their way down the hill among the banana plants, we saw four Indians. In spite of Victor's description I received a shock of surprise at their appearance. Somehow one did not expect to come across primitive, half-naked Indians in this area. Their only covering was a loose grey cloth slipped over their heads, pulled G-string fashion between their legs, and bound around the waist with a bark sash. Their black unkempt hair was bobbed all around. Their brown bodies were overlaid with black dirt. They were certainly as wild a group as I could have hoped for. Although Lopez had known these Indians for twenty years, they were so upset by the sight of strangers that we were not cordially received, and our presents were accepted only when they had procured a leaf in which to wrap them. With little amiability, three of them, including their chief, agreed to come to our camp on the following day to thatch the roof of the shelter we were erecting. We hoped to make our first contact this way and to spread the word that we wished to trade with them. Once our business was accomplished, they did not seem anxious to engage in conversation so, a little apprehensive of our chances of making friends with them, we took the narrow trail back to our camp.

There was plenty to do. The skeleton of the shelter was being erected by five sons of Lopez, and under one end of it we unfolded and raised our tent. It was a complete unit with a heavy canvas floor, a mosquito net window, and a zipper front of netting, but we knew from experience that we would be more comfortably protected under the thatch from both the sun and the driving rain. Inside we put our cots, well loaded with wool blankets in anticipation of another bitterly cold night, a light box for our books, and all our clothes encased in a heavy canvas duffle bag. The opposite end of the structure was enclosed with hand-hewn, split pine boards for a kitchen, the only part of the house which was walled, for we knew that stray animals had a penchant for kitchens. Between the kitchen and tent was a space for a dining-room, work-bench, and developing equipment. We were self-contained in a camp which cost about $5.00 to erect, made completely of material near at hand, oak posts, pine walls, hand-hewn cedar planks for tables, and all tied together with vines. There was not a nail in the whole structure. We had had the same type of building erected in other places, but this was our best one. All we lacked was a roof.

Early morning brought three Jicaques. They came burdened with leaves from the Suyate palm, and with hardly a word to us, went off into the woods for more leaves until there were half a dozen great piles of them and several coils of the vine with which they tied the cross pieces. Girdling up their garments, which had been allowed to hang below their knees, lighting up their diminutive pipes filled with rank green tobacco, two of them climbed on to the roof and, with the smallest Indian handing up leaves, went to work. In spite of our attempts to talk to them they never acknowledged our presence. Even a new pipe given to each one had no effect. We began to feel that our trip into their country had been rather in vain, and although it was still early in our relationship with them, the possibility of their thawing out was not too good. Enmity could be conquered, but indifference was more difficult. At the end of the day they returned home, promising, though reluctantly, to come back the next day and

Wave upon wave of mountain ranges greet the traveller from the air. Without a break, they stretch end on end.

Honduras, Central America, in the country of the Jicaque Indians, 3,500 feet above sea-level in the region of pine, oak, and rain forests. Honduras derives its name from Hondo-Deep; whether it refers to the depth of water in the Gulf of Honduras or the deep undulating aspects of its geography has been a source of dispute. Honduras has not the high range of Guatemala, nor volcanoes, but is a series of deep ranges throughout the whole republic.

On the way to San Lorenzeo, the Isla de Tigre rises cone-shaped from the bay, displaying its volcanic origin. On this island is contained all the civil and military administrations of the ports.

finish the roof. The next day was a little better, and when they had completed their work, our rather generous presents led them to shake hands with us and smile before they left.

Jesus Lopez told us that the Jicaques were deathly afraid of "catarro", a common cold, from which they died like flies. For that reason, and because of their general distrust of foreigners, they were backward about making friends with us. Though we regretted this tendency, we realized that it was the only reason they had survived as a primitive race and had not been absorbed by the mestizos.

Before we could hope to study them it was our task to break down that resistance which had been built up, through necessity, for many years. At one time (before the coming of Columbus on his fourth voyage to the new world), the Jicaque Indians occupied, particularly on the East Coast, almost all of what is now known as the State of Honduras, from Trujillo in the south to as far north as the Guatemalan border. Undoubtedly they were a South American infusion, bringing with them the manioc-culture of the South in contrast with the tortilla culture of Central America. Their rude tribes must have bordered on the more civilized Mayas, but they absorbed nothing from them. When the Spaniards arrived, two things occurred to the Jicaque Indians: some gradually mixed with the white man and adopted his customs, dress and speech, others retired deeper and deeper into the mountains. In the hills of Yoro, where we had caught the Quetzal birds, there were many isolated families indistinguishable from the half-caste Spaniards. In 1856 the Governor of the Province of Yoro forcibly compelled the Indians to cut and transport sarsaparilla root to the coast, to the neglect of their own crops which provided them with their only supply of food. Obviously the abuse became so great that it was intolerable and two men (pure Indians), Pedro, accompanied by two wives and several children, and Juan with his one wife, migrated far from that district into the hills of the Montaña de la Flor. There, to protect themselves from the white man, they erected a stockade about their village and continued their primitive life, dressed in bark cloth, using blow guns with clay pellets, and hunting with bows and arrows.

From this original stock of five adults grew a colony which at one time numbered two hundred, but which at the time of our visit had been reduced to half that by the ravages of pneumonia, against which the Indians had no resistance. Their importance to ethnology lies in the fact that they are a pure, inbred group, whose customs are uncontaminated (their only concession to progress is the use of a cheap cotton cloth for their one traditional garment) by the white man. As a South American infusion they represented the northernmost thrust of this "culture". At the time of our stay among them they were quite unknown to the outside world, although living only about fifty miles from the capital, and the general belief was that all Jicaques in a primitive state were extinct. It was from some of their distant relatives in Yoro that we had obtained a small vocabulary which helped us in our first contact. The leader of the tribe understood a few Spanish words picked up from traders who bought their corn, and with this small beginning we were able to converse.

Victor and I made repeated "attacks" upon the Indians at their village until finally they became less timid and began to drift down, one by one, to our camp. We convinced them that we had no diseases, and to protect them ordered that none of the mestizos should come to the camp when one of the Jicaques was there. As their curiosity got the better of them we showed them all our possessions (our folding chairs seemed to interest them most) and in exchange began to build up a vocabulary of their language. It was a most disconcerting tongue, full of starts and stops and gutteral sounds. I never was able to understand very much, but by constant practice Victor could greet them and carry on quite a conversation. Like all Indians they were highly amused at a successful pronunciation of their dialect. We had one friend among them who insisted on always speaking to us in "n'Turrupan", their own name for themselves, even though he knew that we could grasp very little of it.

The weeks went by with frequent visits to their village and return calls from them. We always went laden with pipes, knives, salt, and cheap cotton cloth, and in return they brought us two or three fat

chickens or bundles of the tuber, yuca. Our ethnological collection grew as we persuaded them we really wanted samples of their blow guns, bows and arrows, bark cloth and fur sacks. They thought we were joking at first.

We tried at all times to keep our word with them, sending for goods they particularly wanted, powder and shot and heavy blue denim, curing them of ulcerous sores on their legs, and in the end we completely won their confidence so that at last we were admitted where no outsider was ever allowed, into their houses and village.

Their houses were simple square buildings, walled with split pine, and thatched with palm. In the centre was a three-log fire over which they cooked, and grouped around it were platform-like beds of hard cedar planks. Usually there was a post in the corner, like an old-fashioned hat-rack, hung with the skulls of deer and other animals of the forest. That was all, except for racks for cooking-utensils, and dried corn. In these smoke-blackened, dirt-floored huts the Indians lived about as miserably as can be imagined. They possessed no fine feather ornaments or cotton weavings, and if they had ever known the weaving craft (which is doubtful as they seem to have jumped from crude bark garments to foreign cloth) they possessed no signs of it now. They had no colourful feasts and dances to change the monotony of their lives. As far as we could gather, these timid people were the melancholy remnants of a once great tribe which was slowly dying out even in this isolated place. Only a few years before fifty of them had died of pneumonia, for they had no means of combatting it and the simplest rules of hygiene were unknown to them. We tried to explain that rest, warmth, and diet were the best cures for a cold in its early stages, and pointed out that expectoration was a chief cause of the spread of the disease. We even attempted to trace for them the history of a microbe and how it could be absorbed into the system. Poor people, they listened attentively, but of course it was hopeless to expect them to understand.

One day the chief, Fidelio, mentioned that a child of his was suffering from a plant burn. In collecting leaves I had contacted the same "Palo de Sarna" (Rhus striata), a tree whose sap is generally dreaded among the natives. On my arm, the burn had spread and itched until after trying several different ointments, I had successfully cured it with one. Confidently we told Fidelio that we could cure the child, and on the next day he carried the girl to our camp, accompanied by his wife, who never in her life had come so far down the mountain. One look at the child told us it was hopeless. The burn had spread from the soles of her feet to the scalp, and there was not an inch of skin that was not burned and dried by the poison sap. She shivered helplessly even in the warm sun. We had not nearly enough medicine to cover her and all we could do was to apply some to the head and around the swollen half-closed eyes. With hospitals, doctors, and nurses she could have been saved, but it was futile to hope for improvement without them; she died a few days later.

The last week of our stay among the Jicaques was so full of activity that it seemed impossible to complete everything before our departure. First of all we had finally found several Indians who consented to let us make anthropological masques of their faces. A grateful Jicaque man whom we had cured of leg sores was the first subject. As I started to paint the thick, warm, rubbery substance on to his face, I expected him to leap out of the chair, but even when I had thoroughly covered his mouth and nose (except for little holes left open at the nostrils) and his eyes, he did not quiver. It was fast work to get several inches of the material built up, layer by layer, before it hardened and to re-inforce it with metal bars. In the meantime the Indian made not a move. I am sure I would have wiggled a bit to have had my face completely covered with such a mess.

Just as I had him nicely smeared over, with a Frankenstein monster-like masque, his brother arrived over the hill and it took us some time to persuade him that we were not bewitching Baltran. At last I gently tugged the masque free of the hair and lifted it off. Except for a few air holes it was almost a perfect negative and I lost no time in making the positive of a hard substance which had to be melted and painted inside the negative. The result was startling. Even the Indian himself was surprised. Every feature and wrinkle was preserved.

During the week we made six masques, choosing completely different types each time and obtaining a good cross-section of Jicaque physiognomy. I am still amazed that those Indians, the most timid we had

ever met, would allow us to make the impressions.

Another event of our last days among the Jicaques was a special poison fish-hunt arranged for our benefit. The day before, the natives gathered the bark of a tree called "Sopilote" (Piscidia grandi folia) to be used for the poison, one of the various plants which different Indian tribes use for the purpose of stunning fish and which is filled with rotinoe, a substance widely used in insecticides. "Sopilote" was the most plentiful and easily gathered poison bark in that region. Early in the morning the Indians built a bed of reeds, slightly above the surface of the water, and then by damming and converting the flow of the water, caused it to rush through the bed. The poison gathered and the fish traps made, we rode, accompanied by the whole tribe, up the river about two miles and there each native took a bundle of the poison bark and vigorously plunged it in and out of the water until a milky stream issued. Soon we were scrambling down the banks watching the quiet pools for floating fish. We got several and others washed into the bed, but there were not the hundreds every one expected. Some one must have gone contrary to the taboos about the fish hunt which, if not observed, prevent a good catch. The poison does not seem to kill the fish but only stuns them and when we tried to hold them they slipped easily away; it does not affect their edibility. I have heard people call this method of fishing "unsportsman-like" but the primitive's search for food is never mixed with kindliness.

With the completion of the fish hunt our work was finished, and although we hated to leave the pleasant country and the good friends we had made among the Indians, time was limited. On our last day we received a whole delegation of Indians who wished us a good-bye. Several contradictorily remarked, rather touchingly it seemed, "Come again soon to see us; but we know you will never return". At that moment we promised with sincerity that we would be back and that they must keep our camp in good shape until then, but now it seems doubtful if we will ever go back to the "Mountain of the Flower".

The airport of Tegucigalpa. The Taca system as well as the Pan-America Airways use this port.

The palisaded village of the Jicaques. The posts are oak, the house in the background is one of many concealed behind the fence.

The Jicaque Indian with full regalia, an old machete, animal skin bag, pipe and tobacco.

EDITOR'S NOTE-BOOK

R. M. Smith B.Sc., whose article in a former issue of the Journal entitled "King's Highways of Ontario" invited international comment, develops his theme further in this issue with special emphasis on Ontario's new Queen Elizabeth Highway. Mr. Smith, Ontario born and a graduate of Queen's University in Civil Engineering, has followed his professional calling for over a quarter of a century during which time he has been associated with the Department of Highways, and for many years has been Deputy Minister of the Department for the Province of Ontario.

Donald S. Rawson, born and educated in Ontario, is a specialist in the field on which he writes in this issue under the title "Sport Fishing in Canada's National Parks". Since receiving the degree of Ph. D. from the University of Toronto a decade ago, he has been associated with the University of Saskatchewan as professor of Biology, during which period he has been occupied with research in freshwater biology and fisheries. Ten years of work investigating national parks throughout Canada form the basis for his article.

Christine I. Von Hagen was born in California where she attended the University, specializing in Botany. Exploratory work with her husband from 1934-1938 to Ecuador, the upper Amazon, Galapagos Islands, Honduras, and the Mosquito Coast, provided botanical collections from these regions which may be found in the New York Botanical Garden (N.Y.C.) and the British Museum, and authoritative first-hand material for the article entitled "Unknown Honduras" appearing in this issue.

AMONGST THE NEW BOOKS

"Humane Endeavour", the Story of the China War (New York: Farrar and Rinehart, 1939, $2.75). This is a book every thoughtful person will want to read, not only because it is the complete story of the war in China from its beginning but because of the unusual equipment of the author to analyse the many elements in the struggle and his uncanny insight into the minds and ideals of Japanese and Chinese leaders. Haldore Hanson went to the Far East in 1934 fresh from an American University. A visit in Japan was followed by a year's service with a fine old Chinese diplomat, teaching in universities in Peiping and Hankow and free-lance travelling and writing for many of the important English publications in Shanghai. When the Japanese invasion took place in July 1937 he was the editor of a Chinese political magazine in Peiping and at once became a roving correspondent for North and South China. This involved no end of thrilling and dangerous escapades, interviews with famous generals and political leaders, with peasants and private soldiers on both sides of the conflict, with visits to military bases, air factories, wrecked villages and cities. Most interesting are his accounts of the heroic efforts made by the Chinese, especially the younger generation, to carry on educational work in the midst of paralysing conditions. Fearlessly and without bias, Mr. Hanson tells his story. There are some ludicrous episodes which lighten the grimness of warfare, and many delightful character studies and accounts of wily political manoeuvring, which bring forcibly before the reader how baffling the problem and how terrific the odds are in Chiang-Kai-Shek's tremendous struggle. Some of the author's most vivid experiences arose out of his association with the guerrilla armies in Hopie and Shanshi, which no other correspondent has visited. He describes what really happened when the Japanese took Nanking. He tells of the *rapprochement* between Chiang-Kai-Shek and his decade-old enemies, the Communists, and of the scoop that fired the interest and envy of newspaper men all over the world. He pays tribute to his fellow-correspondents, especially to Edgar Snow, author of *Red Star over China*, with whom he sometimes travelled and he tells of finding Dr. Bethune cheerfully carrying on his merciful work under heart-breaking difficulties.

The author says:

"Every correspondent in China has been torn between two conflicting assignments. His home office continues to cry for "colour", "flare" and "punch" while a small but influential section of the American public wants an explanation of the political and economic backgrounds of the war . . . — he must acquaint himself with the language and history of the country . . . . study its industry and trade and examine its social philosophies." Every chapter of the book proves how admirably Mr. Hanson has measured up to these exacting demands. The conflict in the Far East is of such far-reaching importance in the policies of nations throughout the world that no thoughtful person should be content to be ignorant of the truth concerning it. For a fair discussion, for a mine of information, a sympathetic understanding and a skilful and attractive presentation, it will be hard to find a better book than Haldore Hanson's.

Catalogue of the John Clarence Webster Canadiana Collection, Pictorial Section, New Brunswick Museum. One of the largest and most interesting collections of Canadian pictures, maps, coins, medals and other treasure trove is that presented to the New Brunswick Museum in St. John by its Vice-President, Dr. J. C. Webster. Dr. Webster's name is a household word in the Maritimes for his splendid educational work in fostering the study of Canadian history, especially by the establishment of historical museums to which he is a generous benefactor. The work of the New Brunswick Museum has been outstanding and its series of publications are eagerly sought after. The latest to appear is an interpretative catalogue prepared by Dr. Webster for his fascinating collection of two thousand, four hundred and eighty-eight exhibits, charmingly displayed in the fine museum in St. John. The catalogue contains three hundred and sixty-eight pages of carefully detailed descriptions which will prove a mine of wealth for historical research. It should be said that Dr. Webster's collection covers all Canada and ranks next in importance to the pictorial collection in the Public Archives.

F. E. Forsey.